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1984 and all that . . .

This week's examples of the funny things people say in the media about computers were sent in by A. J. Stadall of The Wirral, and John Foote of the National Engineering Laboratory, who each win £5.

The factory, which will produce microprocessors and semiconductor

memories of 16K silicon chips with up to 16,000 different uses, was

welcomed by Sir Kenneth Thompson, chairman of Merseyside County

Council.

There are other [microprocessor-controlled] games, considerably more

complicated, such as the electrical chess board, which can be pro-

grammed to beat you no matter how good a player you are.

Sunday Post, Glasgow

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Dastardly plot uncovered....

Downtime

by Chad



for colours." Asked what would be the result she replied, "Large profits for the firm."

"More serious still," she said, "is the danger that the police could get hold of this information. Then, if someone seen in suspicious circumstances wearing, say, a blue anorak, the police could haul in for questioning everyone in the town whose favourite colour is blue."

"On the same subject," Ms Suet continued, "we've just heard that records are being compiled in Heaven of the most intimate details of individuals' lives, and these books could seriously affect people's chances for salvation."

"We are demanding that a Data Protection Authority be set up immediately, and that one of its first actions must be to send inspectors to Heaven to check up on these records."

Expressing her horror at the disclosures, Patricia Suet, general secretary of the National Council for Diabolical Liberties said, "If this information got into the hands of a mail order firm they could send our advertising shots exactly tailored to people's preference

Producing programmers in sufficient quantities to meet the ever-increasing demand, is the prime objective of the National Computing Centre's DP Threshold Scheme, and the number of students will be almost doubled, from the present 540 to about 1,000 in the next Threshold year, which starts in June. Here, NICHOLAS ENTICKNAP looks at the training scheme at Bournville College of Education in Birmingham, which has completed three courses catering for 40 students, and is currently running a fourth.

Pictured right, Dan Lynch, director of computer studies at the Bournville College, looks on as a group of NCC students work out a problem on one of the Research Machines' 3802s.

On the Threshold of a DP career

AFTER a year and a half of operation, the NCC's DP Threshold Scheme has established itself as a valuable source of junior staff for computer installations. Of the 548 young people who have completed the course, on average more than two out of every three have found DP jobs, many before their course had finished.

The DP Threshold Scheme is run by the National Computing Centre, funded by the Manpower Services Commission. It was initially set up as one of a number of measures by the present government to reduce unemployment, particularly among school-leavers.

With growing government awareness of the importance of computers this has now become a secondary objective. The main aim now is to ensure that programmers are produced in sufficient quantities to meet the ever-increasing demand.

A working party of the Manpower Services Commission is currently studying the success of the scheme with a view to deciding whether any alterations to the way it is run are necessary.

The NCC director of the scheme, George Penney, expects that the number of students taking the course will be increased from its present level of 540 in about 1,000 in the next "Threshold year", which starts in June.

A total of 53 courses have been run or are in progress. One of the centres that has been involved is Bournville College of Education in Birmingham. The college has now completed three courses, catering for 40 students in all, and is currently running a fourth.

Director of computer studies Don Lynch told Computer Weekly that over 80 per cent of the students who have completed their studies are now working in DP installations. Of these, over a half were offered jobs by the institutions in which they worked as part of their course. The others won their jobs in open competition. There is one instance of a student gaining preference over 200 other applicants, many of whom had programming experience, or better academic qualifications, or both.

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More than 80 companies have participated in the scheme with Bournville College. This involves acceptance of a student as a junior trainee, working either as an operator or a programmer, for either nine or 15 weeks. The company is under no obligation to offer a job to the student when the training period has ended.

Trainees are required to con-

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ICL to provide 1980 Olympics results

A CONTRACT worth £930,000 for a text-editing and store-and-forward message switching system for disseminating results from the 1980 Moscow Olympics has been won by ICL.

Under the contract, ICL is to

supply two 2004s, each with 86K words of store, four 80 Megabyte disc drives, tape drives, card and paper tape readers and printers. The peripherals will be switchable between the two processors, with the second providing stand-by cover.

The system will be compiled on an unidentified IBM computer and transmitted to the ICL system for editing and for onward transmission to five Press agencies — Tass, UPI, AP, AFP and Reuters.

As well as the hardware, the contract price covers systems design, implementation assistance, and support during the Games.

ICL was one of a number of companies asked to submit proposals for the system. Clif-HB is the European leader in compilation and distribution of sports results, a field in which ICL has little experience.

Unlike the Montreal

Olympics, held in an unfinished stadium, the Moscow Olympics are the subject of exhaustive preparation. A full dress rehearsal for both the stadium and the ICL computer system will take place in July with the Spartakiada Eastern European Games.

The Honeywell installation

was acquired when Centre-file bought Management Computing Services in 1979, and Centre-file made it clear at the time that the

newly installed machines would be building societies with about three million clients.

Centre-file's managing director, Ron Sennie, who took over after management shake-up last year, has pointed out that payroll is now one of the fastest growing areas of Centre-file business and is used by 1,000 customers with 800,000 employees.

Other Centre-file services include major online accounting operations for two groups of clients, 27 stockbrokers in the City of London that handle something like 80% of all Stock Exchange bargains and a collection

of building societies with about three million clients.

Apart from the two processors,

the line-up of IBM hardware at Leman Street, all of which is purchased, includes two IBM 3800 laser printers, each running at up to 13,380 bps, and 24 IBM 3360 disc drives holding 7,200 Megabytes. An IBM 3850 mass storage system that can hold up to 100,000 million bytes is to be installed.

The Leman Street site is near NetWest's own management services centre at Gadmen's Fields near Aldgate.

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MICHIE'S PRIVATEVIEW

Equipped to make a proper job of philosophy



A SHIFT of view, which to some computer people seems very curious, is bringing the study of philosophy out of the shadows. Scientists and engineers normally regard philosophy as just a particularly pretentious "no win" discipline, whose practitioners claim to be the great explainers. Yet as soon as real progress is made with some question, the topic is taken over by a different kind of professional — trained actually to find out how things work rather than to speculate about why it all so difficult.

So questions of perception which used to be "philosophy" are now investigated by psychologists. Worries about reasoning and logical consistency have been taken over by mathematicians. Matters of linguistic usage now belong to theoretical linguists. Numerous earlier takeovers could be cited. Aristotle tried to settle by commonsense argument whether light travelled at a finite speed. We smile at his audacity, and do not feel it in the least strange that physicists rather than philosophers are now consulted about such matters.

The successful annexations by new-born sciences commonly followed advances in technical instrumentation. Are

things possibly brewing up to a final takeover, when some new instrument will enable the residue of philosophical questions to be annexed in one fell swoop by a new science equipped to make a proper job of it? I am one of those who believe so, holding that the remaining, and deep, problems of causality, purpose, consciousness, knowledge and belief can soon be taken from people who have made very little of them and transferred into laboratories equipped for machine intelligence work.

For generating excitement

in the reader, Sloman's style of dogmatic preaching, in all its egotism and narrow condescension, can hardly be bettered. But once the imagination has been thoroughly stirred and the reader begins to want reliable technical information presented in objective and orderly fashion, then he should at once abandon his copy of the book in some public place and repair to a library for serious work. In Bob Dylan's words (almost):

"... Read at your own chosen speed;

it's not the book you wanted,

it's not the one you need!"

The difficulty is to know what other texts to recommend. In the form of entire books, as yet there are none. Boden's Artificial Intelligence, or some such term.

That is, however, by the way.

The main point is the position, background of ideas, and ready pen with which Sloman brings to what posterity will see as this

century's most critical upheaval. His book discusses the aims of science; models, concepts and symbolism for interpreting our experience of the world; the nature of explanation, prediction, and control; reasoning — its formal basis, analogy, intuition, the nature of mind and memory; and, running through it all, the role of experimental computing and in particular the methodology of artificial intelligence in clarifying these matters.

A paper of mine, in *Machine Intelligence 8*, is about defining and numerically measuring the amount of knowledge contained in a (machine or human) knowledge-source.

The practical importance of theoretical solutions to these academic-seeming questions is likely to manifest itself in work on large databases and in "expert systems."

A masterpiece in miniature is an introductory typescript prepared for the Sloan Foundation by America's most eminent cognitive psychologist, George Miller. Although technical, it is well within the reach of the interested Computer Weekly reader.

These papers, and treatments by others both published and not yet published attempt to begin where Sloman leaves off.

"The Computer Revolution In Philosophy" by Aaron Sloman, published by Harvester Press, 304 pp, £12.50.

WHEN was the last time you noted an IMTS memory failure? Or suffered (professionally) from the effects of the Star Wars Syndrome?

The answer is likely to be "quite recently" if, like most programmers, your work is directed not at meeting your own DP requirements but those of that barefoot-domesticated beast, the end-user.

This at least is the argument of a recent contributor to the US weekly Computerworld. For IMTS — or "I Meant to Say" — is just one of the complaints laid at the feet of the end-user by Jack Stine in what he calls An Open Letter to DP Users.

On the subject of IMTS he writes:

"This malaise only evidences itself after you have signed off on a set of system specifications and we are nearly finished with the programming phase of the development project.

"It takes the form of an nn pleasant phone call from you after you've examined preliminary output. You tell us that your inventory stock items really number 50,000 not 25,000, or that the Julian date field should be expanded to accommodate the 21st century.

"With regard to changing needs, some say that users are simply not capable of conceptualising all their systems requirements at one (early) point in time. Others claim that users change their minds solely to irritate the DP department.

"But I feel the reason users always seem to change is because they have this ingrained faith that we DP types are ex-

perts at mental telepathy through a combination of instinct, magic, and mind-readiness. We always know what user's needs are — with absolute precision."

Stine notes that exaggerated expectations both in this and other areas may be a side-effect of the glamorous image of much advanced technology.

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Stone concludes with an appeal for appropriate protection when the system details what was wanted.

"We all seek that the psyche pay-off which eludes nearly all of us: that wonderful feeling occurs at turnover time when it tells us with sincerity, 'Buddha, you did it! This system I need and I got with a heap of thanks.'

THIS confused question of the legal protection of software is to be the subject of a two-day conference in Amsterdam in March.

One aspect to be examined will be the current legal position both in the US and Europe. Recent decisions in both places will be discussed.

The conference will also address the topical question of what form of protection is appropriate. Problems have been found in applying either patent law or copyright law to software, with the result that some now think that special legal provision could be the best solution. This was, for example, the position adopted by dissenters to the US commission reporting on the matter (Software File, August 3, 1978).

The conference dates are March 14 and 15 at the Hotel Krasnapolsky, Amsterdam, and it is organised by European Study Conferences (tel: 037-282 2711).

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PROGRAMMER NOTES

End-users' malady — dazzled by SF

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SOFTWARE FILE

No single PDP-11 Coral best for all applications

"THE best choice of Coral compiler for the Digital Equipment PDP-11 is influenced by many factors, some of which depend on the compiler supplier and some of which depend on the user. . . . It is therefore not possible to choose a compiler which is the best for all applications."

The report also includes what are believed to be the first rigorous performance comparisons, based on the execution of IEC-C's benchmark programs. It is in this area that some of the most dramatic differences emerge.

For example, in a test involving integer and fixed arithmetic, the HPAC version is one of the top level of implementation, the most deviations. However, this implementation also offers the greatest number of extensions, including many very useful facilities such as double precision floating point, multiple assignments and the ability to interface with Fortran, RTL/2, and BCPL.

In choosing a compiler, argues the report, what is important is a correct match between compiler (and compiler supplier) characteristics, and the needs both of the application and the user.

The main body of the report consists of a detailed comparison of language features, while including sections on library support, pricing, supplier support, and the history of each compiler.

In most other cases, though, the compilers performed similarly, with variations in run speed not exceeding about 20 percent.

With the draft British Standard currently being circulated, the outcome of a commissioned study has attracted considerable industry attention and has been praised for its lack of bias in this fiercely contended field.

Here, though, as elsewhere in the text, the authors emphasise that the relevance of features can only be judged against user requirements.

Some users keen to ensure portability by conforming to the

standard could find it attractive to avoid an implementation containing additional facilities. For other users, particular extensions could be vital.

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OP SPOT

LAST week's interview with Chris Nunn, head of computer operations at Marks and Spencer's West London installation, described how he has reorganised the site in the last four years. Now here are the views of some of his staff on the set-up there.

Beneficial rule of ops department

GRAFFITI that read "Operations Rules—OK" would not be out of place on the walls of Marks and Spencer's West London installation, because that message sums up the philosophy behind its day-to-day running.

Unlike the goings-on at many other sites in the computer industry, the operations staff there control such matters as system modification, and the acceptance and implementation of new applications.

Much of the department's strength lies in its organisation and the role played by each of its sections.

Led by operations supervisor Dave Spikesley three shifts, each of ten operators, work a 12-hour rota and provide a 24-hour user service. They also work days at weekends.

First line of support for the operators is the system support group, or the fire brigade as it is known. It has a staff of seven and is headed by Penny Fenner, who has a programming background.

Harry Godfrey, a man with

round experience and adds variety to the work.

Trainee operator Tom Roberts, an Australian who has been at the site since last May, told me, "It would be easy for the service controller to put you on a job and leave you there for a week or so, but he doesn't."

"One day you might be making up work, on another operating the system, and on the next doing some quality control."

Tom is due to be promoted to operator grade and is keen to get as much on-site experience as possible.

He continued, "There's a lot to be learnt, especially on the 1904S. But you can also pick up a lot off-line, such as when you are making up work. I'm ambitious. Eventually, I would like to move into operations support."

Supplying the company's six food depots with picking lists and delivery information is one of the most important tasks performed by the department.

Dave Spikesley said, "Tapes are produced as a by-product of

1904S problems by themselves, and are learning about the 2970 at time goes on.

She said, "On the 2970, they are improving with experience. They do some first-line dump cracking, using a guide provided by systems support."

In addition to 'fire fighting,'

the group is responsible for the maintenance, updating and back-up of the operating systems. Two of its members are dedicated to building steering macros, generating system-type macros and updating and repairing the 2970 system.

She continued, "If we are putting patches on the supervisor, or changing the BMEP environment on the 2970, we will prove, in a dedicated session, that we can get the system back to its original state within half an hour."

The technical support group is divided into two sections, software and production.

Harry Godfrey told me, "Of the two, production support is more relevant to operations. It consists entirely of ex-operators, whose main interest in life is producing macros and running instructions for all production suites."

The section inspects the busi-

ness specifications of all new systems to see if they are feasible from an operations viewpoint.

"We pass the estimation around the group to see whether or not it is acceptable. If it is accepted, one of our members is assigned to the project to sit in on all the meetings and advise on operational matters."

The new application will go live until the operating people are satisfied that it is to standard. And after it is accepted, the production support technician is responsible for any modifications.

During the early stages, the production support technician is the link between the operators and the designer of the system. As it progresses, he writes the production macros which

are also used for all the test runs. Gadfrey continued, "What the application is nearly ready, the production support technician will do a familiarisation course with each shift of operators. And we make sure that the shifts do the final tests on our documentation and the macros."

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Then they returned to Marks and Spencer and were involved in carrying out "stringent" acceptance trials on the machine that the company had been offered by ICL.

At Marks and Spencer, the ICL 2970 is used mainly for de-

What the workers think

SENIOR operator Malcolm Swallow has five years' experience in operations, including an eighteen-month spell working as a freelancer.

He joined Marks and Spencer two years ago and was one of the first at the installation to become involved with the ICL 2970 which was installed in the summer of 1977.

"At that time we had no-one with any VME/B or 2970 experience. Up to that time, most of my experience was on ICL 1904S," he said.

Along with two other operators, he spent a fortnight at the Leicester installation of Hogg Robinson.

He continued, "There we gained some practical experience by operating their ICL 2970 under VME/B. We also played about with some testing files and got accustomed to the OCF screens which, of course,

1900 systems don't have."

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At Marks and Spencer, the ICL 2970 is used mainly for de-

velopment work. Most of it runs under BMEP, ICL's 1900 emulation system, and not directly under VME/B.

Said Swallow, "Having seen the 2970 in native mode, it seems a great pity to use it to emulate a 1904S. In native mode it must be twice as quick as the 1904S."

According to Swallow, the target for complete conversion from VME/B to 2970 is 1983.

"We are not just converting systems, some of the older ones are actually being re-written."

The size and many functions of the operations department at the site ensure that there are sufficient opportunities for the operators to further their careers.

Operator Andy Paszkowski has been at the site for fifteen months and would like, eventually, to move into communications.

He said, "Communications must be the thing of the future — the 2970 is built for it. Most of

our work is batch, but we do have an export system online, to the Baker Street head office, and locally we have Maximo for the programmers."

US mainframers need to make big price cuts to stay competitive

General, Burroughs — and IBM," he told Computer Weekly.

"I am not a dalmatian," he said. "I don't believe the competition needs to cut prices by more than 20% to 30%. It will have an impact on margins, but margins have been steadily rising. The computer industry typically goes into recession nine months after the economy as a whole, and the US recession is forecast for the end of 1979, so 1980 or 1981 will be the critical year," he said.

Oppenheimer's Aharon Orlansky.

Hurry Edelson, computer industry analyst with Drexel Burnham Lambert, agrees that the competitors will have to

reprice, but points out that they are selling systems rather than simple hardware. He is also

recording clients to buy computer stacks again, after cancelling all recommendations to buy a few days prior to the 4300 announcement.

"Computer stocks have fallen over 10%, and we are now

recommending NCR, Data

General, Burroughs — and IBM," he told Computer Weekly.

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PEOPLE AND EVENTS



Sutherland for NSC telecom industry

APPOINTED as application engineer manager for National Semiconductor's telecommunication and data processing industry is James Sutherland, who will be based at the company's European headquarters in Fuerstenfeldbruck, Germany. Sutherland's former position was that of application engineering manager for the computer industry.

Mike Kite has become a sales executive with Shefield's GMS Computerizing. He was previously a sales representative with Gemini, and before that with Burroughs and Honeywell.

Colin Cook has been appointed by Storage Technology Ltd as sales director for the UK and Scandinavia. Before joining the company, he was a sales manager with Memoway.

John Parsons is now managing director of ITK International Time Ltd. He joined the board as deputy managing director in 1978.

Keith Rushton has been appointed director of Transitel Communications. He was formerly general manager for the company. Transitel is the joint Excel and Excel of America company which manufactures and markets teleprinters and data terminals.

Willard Kaufman has been named as vice-president and director of components production for Intel Corp. He was formerly director of component production for the company, joining in 1971 from Fairchild Semiconductor where he supervised semiconductor device and integrated circuit technology development.

David Tory has been appointed international director of marketing for Computer Associates International. He became managing director

for CA GmbH in 1976. Jim Byrne has become manager of quality assurance for Computer Associates worldwide. He joined the company's support team as product manager in the Midlands.

Pete Blinnington and Grenville Pidd have been appointed by Redline Computers as customer services area supervisors, for the Southern branch and the Midlands respectively. Blinnington was formerly a salesman for the company, which he joined from Burroughs

where he was a sales engineer. McCollum joined Data General from Computer Machinery Company, where he was branch manager. Branch manager for Ireland is Dick Stiney, who will be based in Dublin. He was formerly marketing manager for Honeywell.

AMIN MIRRISSYSTEMS has appointed Klaus Aumann as sales manager for Computer Associates (UK), when Computer Associates International purchased the UK operation of Carus AG, a company formed by David Tory and three others in 1971.

William Baker has been appointed

tolek Mullis has given up the computer industry in which he has worked for the past 22 years. Last week he took over the tenancy of the Britannia Tap pub in Wootton Kingsdown. He was formerly lecturer with ICL's Education and Training Division, and before that a business consultant in the finance division at ICL's City Wall House in London. He is seen here at the pumps of the Britannia Tap with his wife, Penny.

Executive of Sandwell's top firms

are invited to book tables for the evening, and encourage others to join in raising the required sum, the equivalent of £2 per head for everyone who lives in Sandwell.

Donations should be sent to:

Star Fund or either the Halesowen District Hospital, Sandwell.

McCollum joined Data General as

branch manager for South East

counties (North) for Data General,

and Tom McCollum has become

branch manager for South East

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No Luddites here, says the IDPM

NO offence was taken at the picture painted by Professor David Barron (CW, February 8) of "IDPM following the print unions into last-ditch stand against the new technology", since no doubt it was offered as a debating point.

We can say quite unequivocally that no organisation has done more than this institute to make its members aware of the changing scene and the need to move forward with it. This is not the same as rushing out to buy a gaggle of minis and micros imperfectly tied together in what some vendors choose to call distributed processing. What we have been saying and writing with what must seem irritating frequency is that our members must first establish the facts, then quantify and evaluate them before finally making appropriate recommendations to management.

We are quite clear that if there is good case for a partial or

complete dismantling of the centralised mainframe, then if our members do not make the recommendations, somebody else will and the professional DP staff will be effectively isolated.

It is a matter of record that the initiative for several of these resulted from a microprocessor Forum held in conjunction with Computer Weekly last autumn, when over 100 attended.

We are also conducting both a mass survey of our members on the subject as well as in-depth surveys with a number of selected companies. In conjunction with Informex, we are also running two-day seminars on microprocessors at the Café Royal on four occasions this year. There is no other organisation doing as much and I am sure that Professor Barron will agree this is not exactly the profile of a Luddite.

EDWARD G. CLUFF,
Secretary-General
IDPM.

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

Courses for analysts

I READ with interest the points raised by Judy Cox (CW, January 18) regarding the unavailability of courses for business systems analysts who lack the necessary appreciation of the business environment.

I would like to point out that this need has already been recognised and that such a course is now available. The five-day course, run by Infotech International, is entitled Corporate

COLIN STEED

Infotech International
Maidenhead.

Hoist by his own jargon?

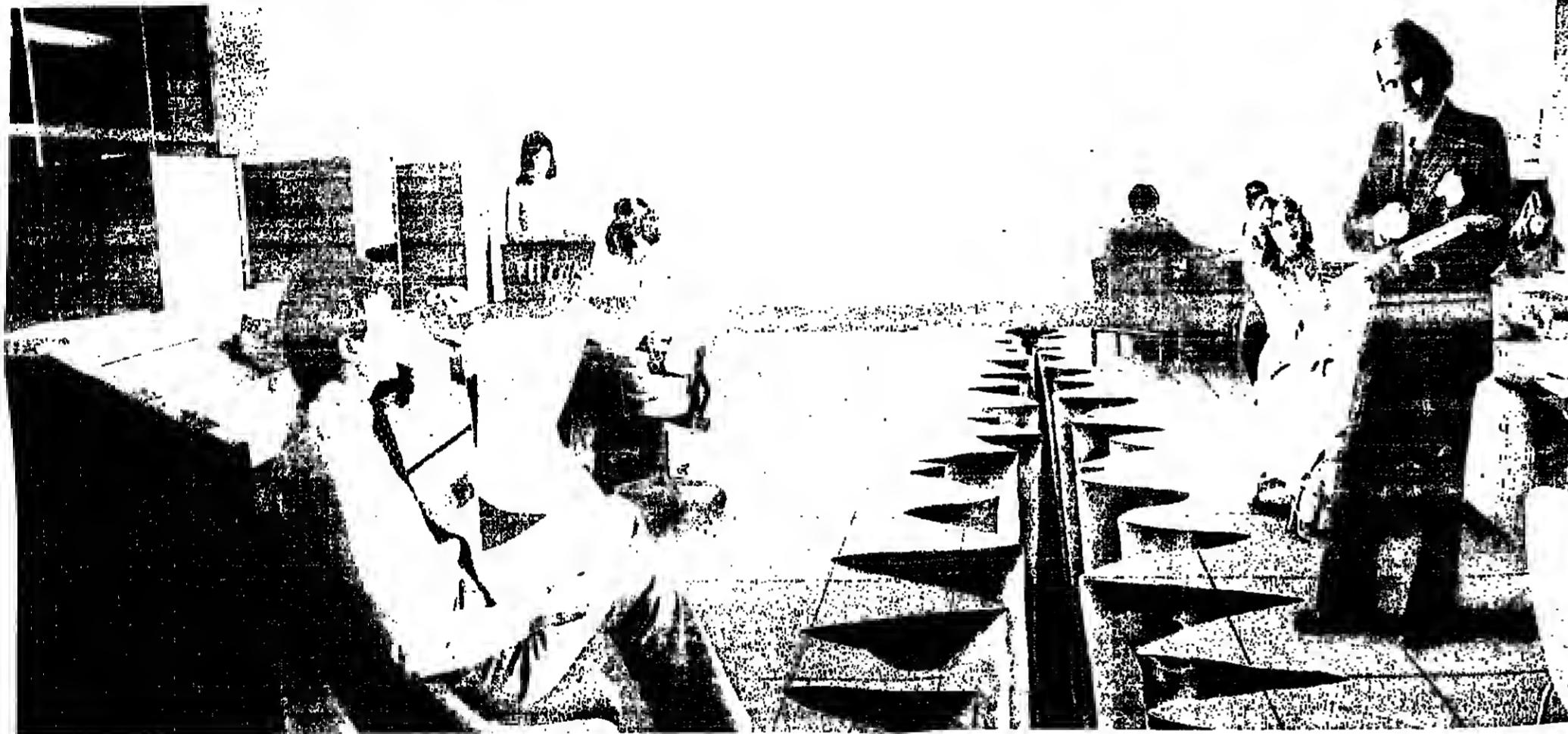
I RATHER think that G. A. Taylor (Letters, February 8) has been hoisted by his own jargon. My OED definition of "boustrophedon" — which doesn't mean much these days, I agree — so I suspect that he means "boustrophedon". My friendly neighbourhood ox (who works for Quine) agrees with me.

RICHARD GRED

Humberstone School Computer
Library Service.

DAVID JONES

East Twickenham.



How to close the 'Software Gap'

Many businessmen have been disappointed by the information they receive for strategic decision-making. It is often too little, too late and too expensive.

Filling the gap between the ever-changing needs of the user and what computer systems provide is really the key problem—a problem we at Cincom have done something about.

Cincom's family of information systems software closes the gap.

First, give the end-user access.

Cincom's new T-ASK is an on-line interactive query facility for end users. Ad hoc and repetitive questions that once required special programming now no longer do.

T-ASK is a "user-friendly" system. With easy to use commands, the user gains access to the data he needs through his own terminal.

He has the data he needs, when he needs it and without additional drain on the data processing department.

A "user-friendly" system demands the most advanced DBMS.

Direct end-user interaction creates increased demands on the data base. As a result, Cincom has developed TOTAL 8.0.

You've heard of TOTAL. Well, TOTAL 8.0 is even better.

TOTAL 8.0 provides superior performance. It is fully multi-task, multi-thread, offers VSAM support, reduced CPU usage, and many other new facilities.

Where products and services come together. In addition to T-ASK and TOTAL 8.0, Cincom Systems offers a full range of data base and data communications products that help close the software gap.

We also feature specialised application systems software and Custom Systems support.

These products and services are backed-up by a complete network of technical

product support, system engineering and educational facilities.

You don't need to live with the "Software Gap"; just call on Cincom to close it.

I'd like to close my "Software Gap." Please send me more information.

Name _____
Company _____
Position _____
Address _____

Telephone _____
Equipment _____
Operating System _____

Cincom Systems Int'l. S.A., Dept. CY, St. Ives House, Maidenhead, Berkshire SL6 1QS, England.

For full details, write or call us:

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Telex 42-

Standardisation of bus structures

THE S-100 bus has become the standard bus structure for 8-bit microprocessors, especially for the family of chips manufactured by Intel and Zilog. When I wrote an article on the bus (CW, November 23, 1978), I must admit I never expected to arouse such interest (and abuse!) on such a dry subject.

However the definition of a standard bus is a vital factor, perhaps as important as the standardisation of a computer language.

Consider how the Digital Equipment Corp has benefited from its definition of the Unibus (a DEC trademark) for the PDP-11 family.

In practice, if not in theory, DEC is relatively free about what is plugged into the bus, and it has gained enormously from this attitude.

People buy DEC computers because they know that any peripheral you care to mention will be able to interface to it, and buyers benefit because they are not tied to DEC for every item they require. Everyone has much to gain and little to lose by the acceptance of standardisation in this area.

Before replying to letters received about the article, I would like to recap on a few of the main points.

1. There are between 50 and 100 manufacturers (almost all in the US) who make an enormous range of boards for the S-100 bus memory (RAM, ROM, PROM, EEPROM) disc controllers, A-D, D-A, speech input, speech out-

accept this, and to indulge in paper exercises so far from the sound of battle in California.

Two readers have written in

to comment on the use of the Motorola 6800 series of microprocessors on the bus. A. J. Ayer, of Gillingham, said that the S-100 bus could not support the 6800 series of microprocessors, whereas G. E. Quick, of Swansea, pointed out that it is already used with the 0800, 6809, Rockwell's 6502 and the Texas 10-bit 9900 processor.

Besides wishing to see a discussion between them, I would like to agree with both. The S-100 system is merely 100 conductor lines in parallel and so, in theory, it can be used for almost any processor that doesn't require 101 lines at any one point.

The significant point is that the vast majority of systems sold have either Intel's 8080, 8085 or Zilog's Z-80 chips as their main processor and so, for practical purposes, the other pro-

cessors that have been used can be regarded as irrelevancies.

Of course, the Zilog and Intel chips bear a strong family resemblance as the Z-80 was developed by ex-Intel engineers.

Basically intended for office work, it uses Digital Research's CP/M operating system and CASU has written quite a bit of software around this.

The central processing unit card and memory come from US firms almost all the rest are UK-made. The cards are double-sided, through-hole plated and thoroughly professional looking.

The CP/M operating system has been implemented on many micro systems, and makes fairly easy for a small firm to write sophisticated software as desired.

However, CASU Electronics,

which has never to my knowledge advertised its products, wrote in from Northwood:

• Turn to page 17

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Main subjects are: health care systems, the influence of informatics on therapeutic decisionmaking, methodistics and technology of medical informatics.

Medical Informatics Berlin '79

17-20.9. 1979



We must be doing something right.

A range of Optical Character Recognition systems that are answering data preparation problems for all sizes of businesses - over 800 throughout Europe - must have a lot going for them.

It is also possible that the IEEE standard may make it respectable and it will become popular for 16-bit systems. An unfortunate fact of life is that standardisation, especially in DP, is rarely based on logic or morality but upon reality. It is even more unfortunate not to

reliability, cost-effectiveness, speed and control that have made ScanData famous are an inherent part of all our software end hardware.

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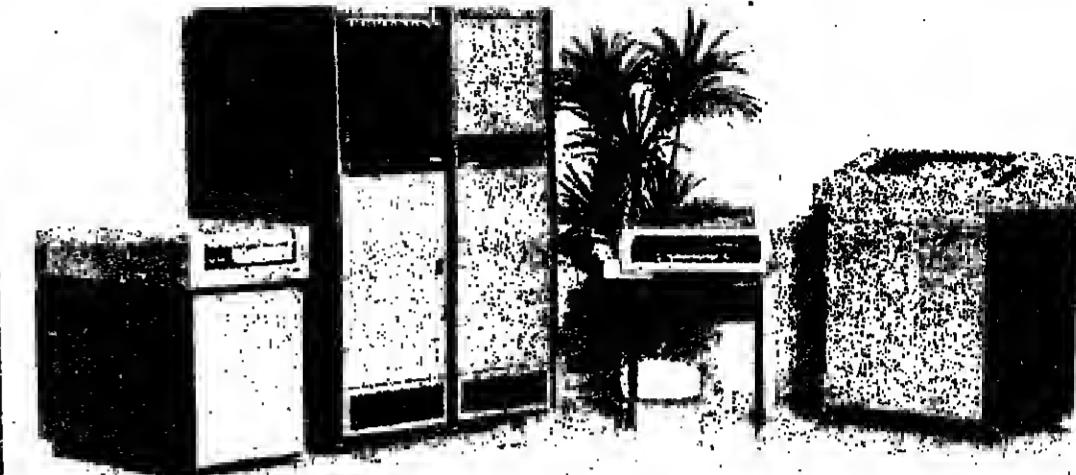
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DATA SYSTEMS NEWS

ISSUE NO 2

A Big Name gets Bigger



Improved 32-Bit operating system

Recently announced changes by the Perkin-Elmer Corporation of Divisional names within the Data Systems Group complete the process started with the company's acquisition of Interdata and Wangco in 1974 and emphasise Perkin-Elmer's belief in the great benefits of a single-source vendor to the end-user.

Computer Systems Division is the new name for the Interdata Division which develops and produces small and medium-sized computer systems and software. Memory Products Division is the new name for the Wangco Division, which develops and produces magnetic tape, disk and other mass storage devices.

Terminals Division, which produces and markets a range of video and pointing terminals, continues to operate under the same name, as do the Customer Service and International Divisions.

A new, event driven, multi-tasking operating system for 12 bit minis, called OS/32 RO4.1 has now joined the range. It offers improved functional and performance improvements over the previous 32 bit OS introduced in 1974. The Perkin-Elmer single integrated system can be applied to commercial transaction processing and scientific number crunching.

The software, used with the Perkin-Elmer 7/32 and 8/32 computers, costs £550 per loading, installation and a year's membership of the Perkin-Elmer software subscription service.

PERFORMANCE IMPROVEMENTS

To maximise task throughput in the UK, Perkin-Elmer Data Systems Ltd. markets services and supports the products of Computer Systems Division, Memory Products Division and Terminals Division.

ONE NAME

Noelias G. Bark, Managing Director of Perkin-Elmer Data Systems Ltd., said that the changes

PERKIN-ELMER CHOSEN

With financial aid from the Science Research Council assured, the Group set about the task of evaluating suitable equipment.

Within a fixed budget allocation, the specification called for a totally integrated 32-bit system for fast processing and reliable back-up.

The chosen system, a Perkin-Elmer 8/32 processor with 512KB of memory and 67MB of disc, a 600 line printer, terminals and graphic displays, together with the Fortran VII package, was judged best buy. The Group now eagerly awaits the imminent installation of this exciting additional facility.



The Industrial Automation Group at London's Imperial College is about to take delivery of a Perkin-Elmer 8/32 Minicomputer System which includes the first UK installation of the new globally optimising Fortran VII package recently announced by Perkin-Elmer.

INDUSTRIAL RESEARCH

The Group operates at post-graduate level on major research contracts for industry. These have included steel strip mill control for British Steel Corp and GEC, energy saving for BSC and production control for the Science Research Council's Teaching Company Scheme.

The approach involves multi-variable analysis, dynamic modelling and optimising techniques, requiring some very hard compiling and a 'conversational' facility. With increasing demand for large-scale simulation, a decision

was made some twelve months ago to supplement the College's sophisticated but heavily loaded computer facilities with increased capacity.

Within a fixed budget allocation, the specification called for a totally integrated 32-bit system for fast processing and reliable back-up.

The chosen system, a Perkin-Elmer 8/32 processor with 512KB of memory and 67MB of disc, a 600 line printer, terminals and graphic displays, together with the Fortran VII package, was judged best buy. The Group now eagerly awaits the imminent installation of this exciting additional facility.

Three Perkin-Elmer 7/16 minicomputers provide the very comprehensive in-house signal processing facilities at SPAG (Signal Processing & Application Group), a contract research group within the Cranfield Institute of Technology.

The first Perkin-Elmer system was installed some eight years ago, and SPAG have since been regularly buying at least three systems per year for their own use or as part of turnkey signal processing systems for major clients.

Cranfield is an independent institution mainly de-

Sintrom Appointed Distributor

Perkin-Elmer at Cranfield

Perkin-Elmer Sales Executive Tony Beswick seals the deal with Sintrom Sales Manager Ian Priestley, appointing his company as the first stocking distributor of the new Perkin-Elmer Bantam low-cost VDU. Sintrom is well established and highly respected, with a strong and efficient service and customer applications force.

Introduction of the Bantam represents a powerful thrust into the UK market by the Terminals Division of Perkin-Elmer, with a highly compatible terminal. At a one-off price under £600 and substantial quantity discounts, it offers probably the best price/performance currently available.

Sintrom is an independent institution mainly de-

tasking operating system. CAI Marlin Fortran VII, system diagnostics and complete documentation. The larger system has 75MB of main memory, 67MB disc and the Marlin Update Package with 8K writable control store and is priced at £91,999.

Two Fortran VII-based packaged computer systems are now available from Perkin-Elmer. Each combines the univac 32-bit Model 8/32 Megamax® with the globally optimising Fortran VII introduced last October. Perkin-Elmer now offers the latest Fortran execution in the industry, enabling users with such applications as scientific research, simulation, industrial automation or data acquisition to develop application programs as fast as or faster than any other mini-computer system.

TWO SYSTEMS

The smaller system, priced at £63,810, includes a Model 8/32 with 128K of main memory, high speed floating point hardware, 10MB disc, 800 hpi magnetic tape, a Carousel console, Dynamic OS/32MT mult-

tasking operating system, CAI Marlin Fortran VII, system diagnostics and complete documentation.

The larger system has 75MB of main memory, 67MB disc and the Marlin Update Package with 8K writable control store and is priced at £91,999.

To quote Marlene Mansfield, London Ambassadeur Fortran VII is so fast that it has taken programs that have run on our 32-bit processors and executed them anything up to 400% faster. During program development, Fortran VII programs can be compiled at speeds exceeding 1500 source lines per minute. Automatic job control allows Fortran programs to be compiled, linked, loaded and executed with a single command input.

Metal Merchants Brandeis, Goldschmidt who know how to judge a fair exchange chose a Perkin-Elmer 7/32 system for on-line accounting and trading transactions

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CHESSLAB

The challenge of lost-in-two-ply patterns

By DONALD MICHEL

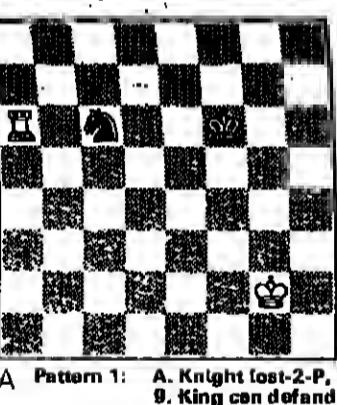
THE theme of pattern recognition in chess has been aired in an earlier Chesslab with an illustration from the ending king-rook-king-knight. This same deceptively simple-looking ending was the subject of a masterly analysis by John Roycroft (CW, 10 August, 1978). Today we consider the task of spotting "at a glance" (supposing that it is the knight's side to move) that the game is lost in two ply (ie, one move by the knight's side followed by one move by the rook's side).

By "lost" we mean that the knight's side is checkmated, or that he has lost the knight without compensation (a stalemate position would count as compensation, as also would a position in which he could take the rook in return).

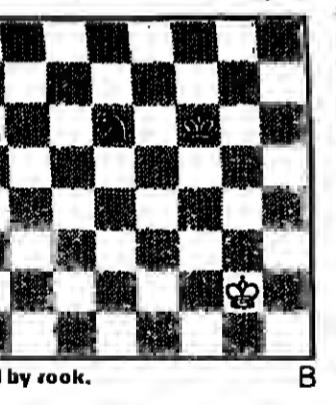
I say "at a glance" because experts and masters do in fact do just this. The alternative of searching the tree of possibilities to a depth of two would be tedious for the human player, and expensive in processor time for program. Why flog the CPU through all the variations if a well-chosen set of neatly coded patterns will do the trick?

But here is the rub, and the substance of this New Year invitation to the demon programmers who assuredly abound among our readers.

How hard a task is it to program the relation "knight's side lost in two ply", and get it right. My conjecture has been that it would be very hard, based on a little experience in our



A Pattern 1: A. Knight lost-2-P, pinned by rook.
B. King can defend.



B A Pattern 2: A. Knight lost-2-P, skewer attack by rook.
B. King can defend.

laboratory at Edinburgh. Consequently I took it as a suitable task for a study in semi-automatic programming with my Stanford graduate class during a recent working visit.

The hunch was, briefly, that automatic program synthesis

must fall is here more subtle; but when you have programmed that, how many equally subtle "lost-in-two-ply" patterns lurk unsuspected in the total problem space?

To help things along, and to activate the chess-programming centres of the brain, I reproduce an annotated set of examples of the concept, each paired with an illustrative counter-example. From now on, readers, you are on your own.

Any program in any of the following languages: Fortran, Algol, Pascal, Lisp, Imp, or POP-2, which the programmer believes to be a correct implementation of my informal spec, should be sent to Chesslab, with specimen output. The output should at the very least include the results of running the program on all the positions printed here.

Timing and store-occupancy data are welcome, also estimates of programming effort (preferably objective estimates, please, including all time devoted to studying any aspect of the problem).

Successful entries will be the subject of discussion in future Chesslabs.

who read this column
At first sight, one tends to think that there is not too much in these patterns. Take the positions in Diagram 1, a simple fork. Any fool can see that the knight's side is lost in two ply. But look at the next position, shown in Diagram 2.

The reason why the knight



A Pattern 5: A. Knight lost-2-P, all escapes covered.
B. Knight can find safety, N-f7.



A Pattern 12: A. Knight lost-2-P, does not move knight except to a7.
B. N-d8 prolongs life.

A Pattern 13: A. Knight lost-2-P, no escape.
B. N-f7: black king threatens to counter-capture rook.

A Pattern 7: A. Knight lost-2-P, knight must move.
B. Knight can take rook.

A Pattern 14: A. Knight lost-2-P, black king is helpless.
B. Black king can move with counter-threat to rook.

A Pattern 15: A. Knight lost-2-P, king must move to a7.
B. Knight moves giving check.

A Pattern 16: A. Knight lost-2-P, all moves irrelevant.
B. Black king to h6+counter-threats with stale mate.

A Pattern 17: A. Knight lost-2-P, counter-threat to rook does not help.
B. Black king's counter-threat does not help.

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'Standards tend to evolve by some process that defies human prediction'

From page 14

languages on to its system once CP/M is installed.

For example, CASU should be able to buy a California University Pascal compiler and implement it on its system without software patches.

In any case, congratulations are due to a small UK company for developing these high quality S-100 boards themselves. Compare them to ITT which has bought the Apple personal computer from the US and stuck its own label on it to sell it as a small business computer.

As a generalisation, there was not much to choose between the 8-bit micros, especially if the date of development was taken into consideration. They were mainly 8-bit data, 16-bit address machines able to access 64K bytes directly.

The Zilog 16-bit Z-8000 comes in two packages, one with 16-bit addressing (64K bytes) and the other with 23-bit addressing (8 Megabytes). The Intel 8086 can address one Megabyte directly (20 bits).

The bus situation is further complicated because the devices are also much cleverer than their 8-bit nephews using dual port memories, able to use mul-

tiple processors, as well as having different dynamic memory refreshing arrangements.

Furthermore it is very likely that these micros are only interim solutions, perhaps leading to devices with much larger addressing capabilities. After all memory prices are presently halving every year.

Zilog, for one is known to be planning its own strongly defined bus (the Z-bus) for the Z-8000 16 bit micro. No one knows how the 16-bit market will develop. It may stay professional, and it should be recalled that the pressure for the S-100 system came from amateur users. Professionals may be happy to stay with the products of the semiconductor manufacturers, who will use every trick up their sleeves to keep it that way. They will have learnt their lessons from 8-bit experiences and know that the money will be made from supplying whole systems, rather than just CPU chips for a single standard bus.

Incidentally, CASU also plans to produce an interface to a standard computer tape in the near future.

Moving on from the awful

these chips, at least until the dust settles.

Is it possible that a single bus system will be able to cope with all the future vagaries of 16-bit micros, especially when it is a standard developed 6,000 miles away from Silicon Gulch?

The organisers of the E78 bus standard seem to think so, and it would be very desirable if such a standard could come about.

After all it is a waste of human endeavour to develop five different storage module interfaces on 15 different 64K RAM boards.

Unfortunately, past experience of standards shows that they tend to evolve by some process which defies human prediction though easy to explain after it has happened.

Commonsense will have less to do with the eventual standard 16-bit bus than commercialism. The one thing we can definitely predict about the future is that we shall be surprised by it.

Details of the S-100 and E 78 standards can be obtained by sending pre-paid envelopes to: Robert Stewart, 1658 Belvoir Drive, Los Altos, California 94022 USA, or the Secretary E 78 Committee c/o 209 Albion Drive, Pinner, Middlesex.

NEW from PRIME COMPUTER

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Introducing PRIME's new range of 16-bit minicomputers. They provide state-of-the-art facilities for scientific, engineering and business applications. The range includes the PRIME 750, 650, 550 and 450 systems. All four models offer a wide range of features and options, including a choice of operating systems, a variety of memory sizes, and a range of peripheral devices. The PRIME 750 is the most powerful model in the range, offering up to 16 Mbytes of memory and a range of high-speed peripherals. The PRIME 650 offers a similar level of performance, but with a lower price point. The PRIME 550 and 450 are designed for smaller businesses and offer a more compact design and lower cost.

For more information on the new PRIME 750, 650, 550 and 450 systems, return this coupon to Michael Grant, Prime Computer Ltd, The Innovation Centre, Lampton Road, Hemel Hempstead, Hertfordshire, HP2 4LS, or telephone 01-572 6241.

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Privacy legislation is seen as a threat to local govt plans



Man Alive discussion

THE ISSUE OF COMPUTERS AND PRIVACY will be discussed on TV next Tuesday, when *Man Alive* on BBC2 will present a programme on the use of computers by the police.

There will be a film report on the worries some people have about the Police National Computer and Intelligence-gathering systems, and this will be followed by a studio discussion. Taking part will be Charles Reed from the Data Protection Committee, Rory Johnston from Computer Weekly, Patricia Hawitt from the National Council for Civil Liberties, and John Wilson, assistant commissioner for traffic of the Metropolitan Police.

Those attending were all local authority computer and management staff, and several of these expressed concern at the DPC's proposal that information must not be used for any purpose other than that specified when it was obtained. The principle behind many developments in management, they protested, was that information should not be kept in separate compartments but should be managed as a central resource to improve its effectiveness.

One of the speakers, Ken Potts, chief executive of Leeds City Council and a member of the DPC, raised this point himself and said it was not clear how the Data Protection Authority's control over a total local government system would be managed, and how far it was intended that an authority's information could be passed around. Potts was one of the initiators of LAMIS and was fully aware of the problem.

He emphasised that a great deal of informed debate among authorities on the privacy issue is essential, followed by a reply to the Home Office's call for reactions (CW, February 1).

The need for consultation was underlined by complaints that the DPC's proposals were

CW's Rory Johnston will be taking part in the *Man Alive* discussion.

Lamassac is setting up a working party to draw up hypothetical codes of practice that might apply to local authorities, and to assess the cost and staffing implications of the proposed legislation. It is also intended that the working party will encourage authorities to adopt the codes voluntarily in advance of legislation.

Several delegates said that there was not enough time before the end of April for all the consultation and preparation of a submission to the Home Office. Over half a dozen complained that they had not even been able to get hold of a copy of the DPC report; they had ordered it in early December and were still waiting.

Some insisted that a local authority computer department was acting purely as a bureau, and responsibility over privacy

unclear. "It has left too many doors open," said one delegate.

Disagreement even arose between Potts and Sir Norman Lindop, chairman of the DPC, who was an earlier speaker. Lindop said that the committee had not recommended that all private sector computer applications would be registered. Decisions would be made, he said, over which were and which were not important. Potts, on the other hand, was sure that the intention was ultimately to register everyone.

A question that worried delegates was who would take legal responsibility for complying with the Act. "Who would go to jail?" they asked.

Another thought that voluntary codes of practice would suffice.

Roy Elliston of the NCC said that the EEC might force us to do this.

legislate by passing a directive to that effect.

Potts defended the notion of privacy laws, but expressed serious reservations about having to implement them by means of yet another quango, the Data Protection Authority.

He made an analogy with the Employment Protection Act, which he thought was not properly thought out, not striking the right balance between the rights of the employee and the employer.

He gave as an example the requirement that the DPA would have to "take into account the proper interests of concerned parties."

"But how would it decide what these proper interests were?" Potts asked.

should rest solely on the user departments.

Another pointed out that the standing orders of his authority made the computer manager responsible for all matters of privacy. A great deal was outside the control of the OP manager, it was remarked.

There was considerable debate on whether privacy laws were necessary at all, since no evidence could be produced by any of the committees that have studied this that atrocities have taken place.

"We are in danger of legislating against witchcraft," said one delegate.

Another thought that voluntary codes of practice would suffice.

He summed up by saying, "Many users could be seriously affected."

IN ANTICIPATION of the implementation of information technology legislation in the UK, a Think Tank to study employment problems throughout the economy for the next five to ten years.

This proposal was put forward by a discussion group consisting of Auerbach European Ltd, Fred Lamond, and Ted Williams, the Post Office Engineers' Union, at a conference of Office Telecommunications: The Way Ahead, organised by Information Studies Ltd.

"The proposed body would predict changes in the pattern of employment over the next decade, identifying which sectors of the economy were likely to grow and which to decline," explained Lamond.

"It was also suggested that the Ministry of Information Technology should be established, which is in line with some ideas which came out of Computer Weekly/ACM's Park conference (CW, 14/19/77)."

The specific effects of legislation on local authorities' operations are not yet clear, but Elliston listed those he foresaw.

Subject access to files would require extensive modifications to systems, he thought, and possibly a special department to

aid the public in searching.

Relevancy provisions might require quite a lot of reprogramming. There would be confusion over specifying the purpose of information.

As a rough estimate, Elliston suggested £1 million a year as the cost to a typical authority of privacy laws, very little of which would be recoverable in necessary charges.

The first Amdahl 47 mainframe in the UK has been installed with British Airways at Heathrow where it is to be joined by a second one next month to take over running of its reservation system from IBM 370/168.

The two Amdahl 47s at the British Airways London computer centre are ahead of schedule (CW, 6/1).

The need for consultation was underlined by complaints that the DPC's proposals were

unclear. "It has left too many doors open," said one delegate.

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intelligence, flexibility and ease of use and storage are some of the advantages of the key-to-cassette method in the growing data entry market, says Richard Wightman, product line manager for intel-

ligent date entry products with Kode Ltd. He has over five years' experience in the data entry market and has been associated with both the marketing and support of the DataVet system.

Benefits of cassettes in distributed data entry

DISTRIBUTED data entry is not new; it's been around almost as long as data processing itself. Companies with many factories or branches commonly distribute data entry in a local data preparation room at each site before bringing the data together at the central mainframe for processing.

Smaller companies also operate in a distributed data entry environment, often with only one or two paper tape punches or card punches to prepare the data which they subsequently send to a bureau or to a parent company for processing.

What is new are the growing demands for more distribution of the data entry process to the user sites and the availability of suitable equipment for this. As you distribute the data entry process so you move from a large central data preparation room to several scattered sites, each with only a few keystations. Where the data entry process consists of a real time file inquiry and update, then a solution embodying online visual displays must be chosen. However, most data entry is represented by the bulk keying of serial data for batch processing.

In this area we shall look at more detail, and at the reasons why key-to-cassette is an ideal solution.

Distributed data entry sites are small and at the extreme are single keystation sites. Thus, in terms of the keystation hardware, the required equipment must be based on standalone independent keystations. This offers unique flexibility in in-

stallation and later relocation if necessary.

A more recent requirement is that the data entry keystation must have intelligence to meet the changing needs of the user. Where the keystation is replacing a keypunch the user wants data validity checks, e.g. alpha numeric, batch totals, etc., to speed keying and reduce errors reaching the computer.

Where the keystation is going into the "clerk entry" environment, where computing equipment has not previously been used, then ease of use is more important.

A typical terminal could consist of keyboard, visual display unit and twin cassette drives, provided together in an office-style unit.

For bulk data entry the cassette is the ideal medium for recording and storing data at the operating site.

The traditional media, cards or paper tape, are now becoming more expensive while producing a very bulky and heavy output.

A cassette is a tangible output medium but a compact, lightweight and reusable. The same applies to the flexible disc, but this suffers from the disadvantage that it must be treated more carefully. Floppy discs must always be kept flat and operators must avoid touching exposed parts of the disc surface.

Operators are used to handling audio cassettes and will readily move to equipment using a familiar medium. The inherent ruggedness of cassettes ensures the integrity of data, especially in environments not used to the handling of computer media.

Cassettes dropped onto the floor will suffer no damage, and they may safely be sent through the post without damage or loss of data.

Cassettes contain 88 metres of computer grade magnetic tape and have a capacity of around 3,000 80-column records of data if recorded on both sides. A major advantage of cassette recording over floppy discs is that the recording method is standardised to an international specification (ECMA 34-Edition 2, 1973), allowing interchange between different equipments and computers. A key-cassette terminal may thus be used to prepare input to many different computers directly from the first keying operation.

Even more widely distributed

are the operations of Ipswich Computer Services Limited. A computer bureau specialising in the needs of motor dealers, ICS operates a number of systems for garage stock control and management accounting on its computer at Woodbridge in Suffolk. As part of an integrated service, DataVet key-cassette terminals are used widely by ICS customers located throughout the country from Canterbury to Glasgow.

Advertisers have to be.

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Recruitment



In Informatics

Jnr/Snr/Mini/Micro Specialists Denmark

Salaries: £10K - £15K

Our client is the leading Scandinavian Systems and Software Development Group recognised as Market Leaders in its field. Owing to continued expansion in a wide variety of applications areas including Data Communications, Message Switching, Computer Networking and Mini Computer Software, a significant number of experienced career orientated personnel are urgently required. Emphasis will be placed on technical involvement and in-depth experience in the areas of activity outlined above. Whilst a degree or equivalent qualification in either Computer Sciences or Mathematics is desirable, significant relevant experience will be considered in lieu. Of essence is a solid Assembler background within a Mini Computer or Microprocessor environment. Project locations are primarily in Copenhagen and suburbs although candidates can work (should they so desire) in the Netherlands, Sweden or Germany. Of prime importance is demonstrable enthusiasm to relocate to Denmark for an extended period. Every assistance will be given in relocation, including the cost of removal of all personal effects. Initial accommodation expenses and a resettlement allowance.

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Analysts & Programmers Inner/Greater Manchester

Salaries: c £6K - £8.5K

Our client is a major International Company recognised as market leaders in its field and has retained Logistix to assist in recruiting the following key project team members — Real-Time Mini Programmers, Data Base Designers, Communications Programmers and Applications/Software Programmers. Experience of any of the following will be especially welcome: RSX 11, RTL 2, Assembler, PL-1, COBOL, IMS DB-DC. For those who enjoy overseas travel there will be ample opportunity to work at the company's E.E.C. offices in Sweden and the Benelux. Successful candidates must demonstrate qualities of leadership potential, determination and be self starters. It is expected that all staff should have the ambition to achieve Project Management status quickly.

Interviews will be held at one of the company's three UK offices most convenient to the candidates residence.

RSX 11 Programmers Netherlands

Salaries: £10K - £15K

Many of the forefront developments in Mini Computer Software and Data Communications are emanating from Europe and if you plan to move into frontier technology the opportunity arises to join a highly reputed Systems and Software Development group engaged in prestigious projects in the areas of Data Communications, Message Switching, Networking and Process Control. Existing and new project teams require Consultants, Systems Designers, Senior Analysts, Analyst/Programmers and Programmers with relevant experience in at least one of the above areas of activity. In particular, extensive Mini Computer Assembler experience is essential. Successful candidates are likely to be aged between 22 and 35 years with a degree or equivalent (Computer Sciences or Maths) or extensive relevant experience in lieu.

You will most certainly contribute valuable expertise to this industrious group whilst expanding your own threshold of experience through working closely with other professionals at your own level. Our client will pay full relocation expenses for you and your family and provide a generous resettlement advance in addition to meeting the costs of temporary accommodation pending location of permanent housing. Numerous other benefits contribute to make this a very attractive opportunity.

Scientific Programmer Italy

Salary: £10K - £12K

THE CLIENT: A multi-national Research and Development Institution is further expanding its team strength in the areas of scientific project implementation and requires several permanent scientific Programmers with Mini Computer Assembler or Fortran experience. Incidentally, we particularly wish to speak to candidates with current or very recent HP 2100 involvement.

THE APPLICATIONS: A wide variety of projects is currently being developed for implementation in the early 80's. Specialist skills in the areas of one or more of the following are especially useful:

Small Machine Programmers Central & N.W. London

Salary: £5.5K - £8K

A European manufacturer of V.R.C. and Office Business Systems seeks several additional Programmers and Systems Analysts who will be engaged in developing several new, challenging commercial applications. The opportunity also exists to develop into IBM mainframe projects at a later date. Suitable applicants must have current experience of writing Programs primarily in BASIC and secondly Business Assembler within the environment of

Logistix, Freepost 32, London W1E 3YZ

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London W1N 9HA

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Telex: 28800

Programming Analysis

ICL 2950 RUNNING UNDER VME/K

This machine will be installed on February 26th to take the place of our Client's existing 1903A. Located in London W1, their business is insurance and they have a current requirement for the following:

COBOL Programmer/Snr. Prog. Salary negotiable above £5,000 Systems Programmer with 2-3 yrs. PLAN exp. if poss. c£6,000

PROJECT LEADERS & PROGRAMMERS c. £6,500

Our Client, based in Feltham in Middlesex, is currently recruiting both Cobol programming people and project leaders with 2-4 years experience in the Banking and Datacommunications fields. Hardware consists of a variety of Burroughs equipment, but experience of other mainframes and minis would also be welcome.

For more information phone Andy Mogg.

Operations

IBM 370/138/148 DOS/VS

An International bank in the City is seeking an Operator. The suitable candidate should have a minimum of 2 years IBM 370 DOS/VS experience, preferably with POWER. The shift pattern at present, at 21 hour coverage, changing soon to 24 hours. Usual banking perks apply i.e. 3% mortgage facility, annual bonus of up to 15% of salary, non-contributory pension scheme, medical and life assurance plans. Also offered are subsidised meals and travel. SALARY £4,500 incl.

ICL 2903 EXEC I

A Computer Service Bureau in W.I. are looking for an Operations Supervisor to run a 2903 installation. Experience required would be a minimum of 3 years operating 1900 range, or preferably 2903. This is a day time post — hours 8.30 a.m. to 6 p.m. with good opportunities to get into the programming field in the future. Help to find accommodation may be provided by the Company. SALARY £4,500

HONEYWELL 58/PDP11/70

A Company manufacturing laboratory equipment, situated in Croydon, Surrey, are in need of an Operations Controller. At present, they have a Honeywell 58 but are in the process of changing to a PDP 11/70, so the ideal applicant should have Honeywell operating experience and preferably a knowledge of PDP's. The Company benefits include: 4 weeks holidays, a staff pension scheme and staff canteen. The hours are 8.45 a.m. — 5 p.m. SALARY £5,000 neg.

IBM system 3 & System 32

A Computer Service Bureau in the City are looking for an experienced Data Control Clerk to work a 12 hour day, 3 times week. The suitable candidate would be over 25, good at figures and used to dealing with client queries and problems. Benefits include 3 weeks holidays a year, 15p L.V.'s a day and subsidised canteen. SALARY £4,000 + neg. a.a.e.

For more information phone Elaine Collis or Sally Oliver.

All vacancies are open to both male and female applicants. Phone Andy Mogg anytime, or for an application form leave your name and address with our answering service.

01-491 4706

OR WHEN BUSY 01-439 3411
ALTERNATIVELY PHONE ANDY MOGG AT HOME ON 01-998 8444

Knight Computer Services Ltd
14 Old Park Lane, London W1Y 1N1

Staff Services Division of BOC Datasolve Group
A member of Computing Services Association

MYRIAD

SALES SUCCESS

A dynamic salesforce, an unrivalled product range, and first-class technical and administrative sales support are three prime factors in the success of any manufacturing organisation. Our client is the undisputed market leader in the data communications field. The ever increasing demand for their products, and their determination to capitalise upon the tremendous potential of the expanding communications market, has created a number of outstanding opportunities for both experienced sales executives, in territories throughout the South of England, and trainees, to join their highly successful team.

The ideal **SALES EXECUTIVE** will have previous experience of selling data communications kit. However, a successful track record in any computer or electronics related field will also be relevant. A substantial basic salary is offered, plus bonus, generous commission scheme and company car. Commission will be guaranteed initially, and the first year quota earnings are circa £8000, which one may confidently expect to exceed. In an environment where sales, in real terms, have developed rapidly in recent years, the persons appointed may look forward to unlimited career opportunities.

The **SALES TRAINEES** will initially be responsible for providing support to field sales executives, producing quotations and proposals, and maintaining close links with existing clients. After a period of approximately eighteen months, however, one may look forward to a move into field sales. Based at company HQ. in Reeding these positions carry a commencing salary circa £4500. They are excellent opportunities for young persons with electronics or micro-processor experience, or relevant academic achievements, for example, 'A' Level/ONC Physics, who have the necessary flair and enthusiasm to succeed in a demanding commercial environment.

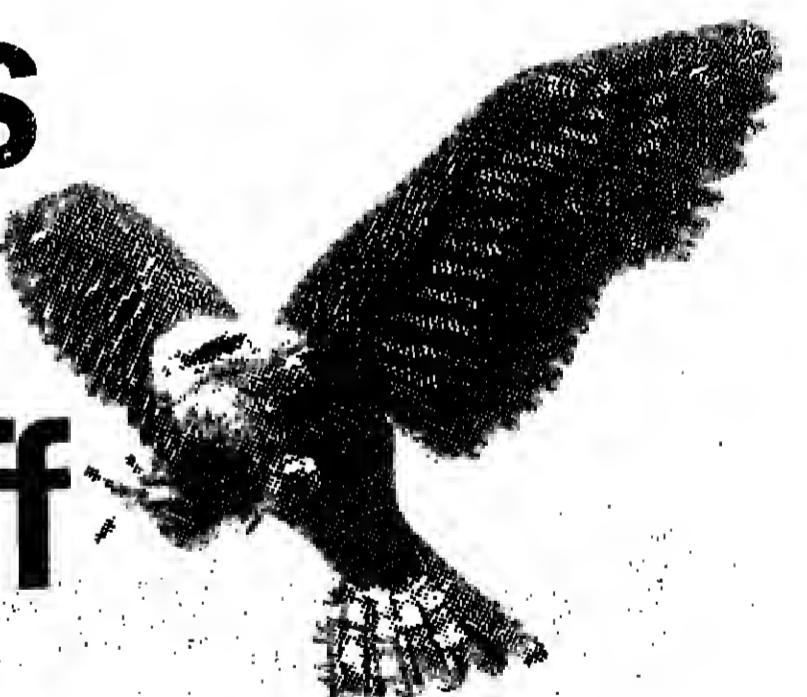
With the increasing trend toward distributed processing and satellite computing facilities, data communications is now one of the foremost growth areas within the D.P. industry. The persons appointed to these positions will join one of the most successful organisations in the U.K. and can look forward to a dynamic and challenging future.

Ref: SW1/2202

MYRIAD APPOINTMENTS LIMITED

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01-353 0981 24 HRS.

Applications software support staff



The company

Honeywell Information Systems is one of the largest suppliers of computing systems in the world, offering the full breadth of equipment from the small but powerful Level 6 mini to the mighty Level 66 and Level 68, renowned for their ability to provide reliability in complex multi-access situations (and a wide range of computers for all occasions in between). We aim to stay ahead of the competition.

The job

You will be working in a small but rapidly expanding central support unit providing concentrated expertise on all applications packages supplied by the company. You will find this a stimulating environment in which to work in the certain knowledge that the demand for applications packages is growing faster than any other section of the industry. Life will not be easy but it will be rewarding.

Location

The Support group will be located in a modern building in Slough along with a number of other groups of staff to whom easy access is necessary. There are other opportunities elsewhere.

You

Will have at least five years' experience of programming in high level languages and will have been directly involved in financial management, distribution, manufacturing or management sciences.

If you have less experience than is specified or wish to live in another part of the country there are other opportunities within the company and we would still like to hear from you.

Salaries

Salaries range from £6,000 upward, dependent

upon experience, plus attractive fringe benefits.

Prospects

If you are the right man or woman for the job you will have potential to grow in ever more rewarding directions and the prospects for doing this within Honeywell are excellent.

To apply

If you are interested then write in confidence to: Garrick Fraser, Personnel Manager, Honeywell Information Systems Ltd, Honeywell House, Great West Road, Borehamwood, Hertfordshire, or telephone him on 01-568 9191.

Honeywell

MYRIAD

SENIOR PROGRAMMER & ANALYST PROGRAMMERS

University Computing Centre, UCC (GB) Ltd., is the British arm of a major European Computer Bureau offering a full and comprehensive service based on a network of Univac mainframes linked to service centres and clients in the U.K. and Europe.

The company offer a range of services to both the engineering and commercial sectors involving RBT, interactive terminals access, and a "walk-in" processing facility.

The London Data Centre, in Euston, has dual Univac 110B computers with two more being installed and serve not only U.K. clients but also, via private lines, offices in the Hague, Frankfurt and Paris.

UCC (GB) Ltd. provide a service to a wide range of industries. Application programs are supported by two major divisions: the Technical Application Division with software to deal with civil electronic, structural and chemical engineering applications and the Commercial Application Division with software for financial, manufacturing, mailing and database applications.

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 24 HRS.

European Marketing-Computer Services

Our client, a leading international computer services company, now wish to expand their European Marketing Operation by recruiting these key personnel for new posts based in South-West London.

MARKETING REQUIREMENTS SPECIALISTS MARKET ANALYSIS AND PLANNING ADVERTISING SALES AND PROMOTION

The Marketing/Planning Operation consists of a group of specialists who act as consultants in Strategic and Operating Planning — marketing analysis — co-ordination of European product launches — research and evaluation — generation of European advertising and sales promotion — all of which is done by placing emphasis on input received from individual European countries.

As this is a key department in the European organisation, it is envisaged that the marketing candidates will come from either a strict marketing discipline within a general business environment or have several years' experience in product planning/marketing in computer services; while the emphasis for the third position will be on candidates with media P.R. experience preferably within the Data Processing Industry.

A percentage of time will be spent in Europe, so the ability to communicate with top management and to influence strategy is important.

Substantial remuneration packages will be paid which reflect the importance placed upon these positions including the usual benefits associated with an international corporation.

TO ARRANGE A CONFIDENTIAL DISCUSSION PLEASE TELEPHONE OR WRITE:

TONY PIDLER, DATA SEARCH
53 VICTORIA STREET
LONDON SW1. 01-222 2022

a member of the
Search group

Data Search

Ports Industry Data Processing Management

Chief Programmer

Up to £6,537 per annum (including London Allowance)

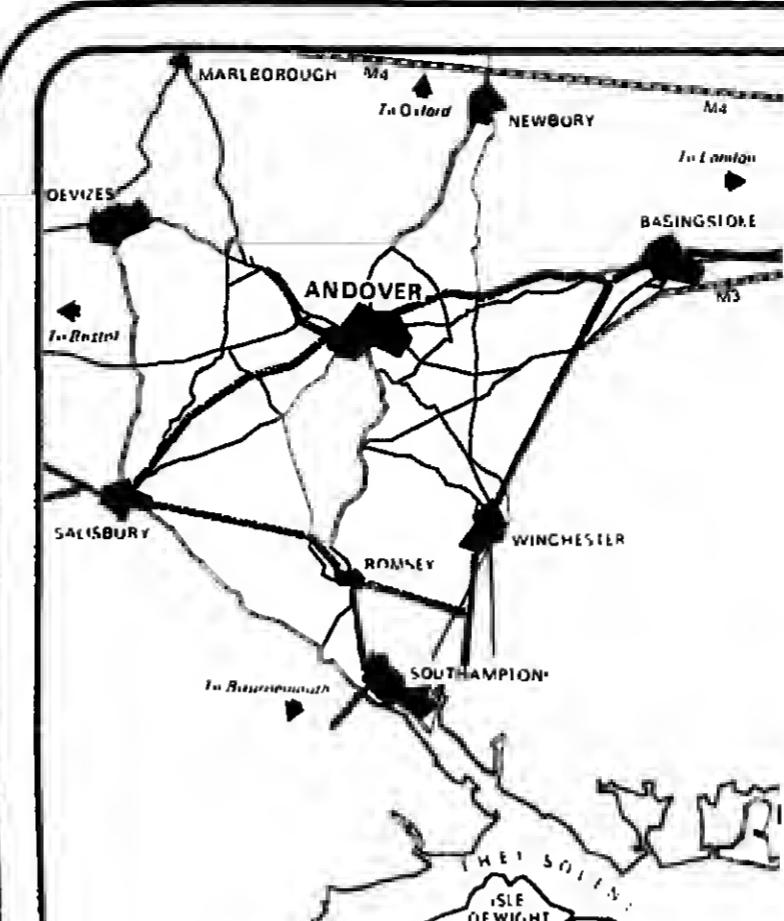
Will be responsible for the technical management of the programming function, advising the Board's management on computer software. Duties will include controlling all projects of the Board's programming standards and optimising program design, development and maintenance work.

The Computer Centre is easily accessible from the M4 motorway and the Western Region British Rail (Hayes and Hounslow Station). Conditions of service include 32 days' (including statutory days) holiday per annum, sick pay scheme, pension scheme and luncheon vouchers (10p per day).

Applicants are invited to write to the Personnel Department, British Transport Docks Board, Mabley House, Mabley Terrace, London NW1 6JY or telephone Jim Haraway on 01-486 6621 extension 6441.



S2 British Transport
Docks Board



TSB
Trust Company Limited

THE COMPANY

A large and expanding Life Insurance and Unit Trust company, part of the TSB group, committed to using sophisticated systems as the prime tool for operating and managing the company. The purpose built head-office at Andover (surrounded by lovely Hampshire countryside) has a Burroughs B6800 machine - recently upgraded from B3800 - and development of integrated insurance systems is well underway. The database system being utilised is the DMS2 with real-time transaction processing on a VDU terminal network planned.

Unique development opportunities exist for computer professionals to become involved in advanced systems.

THE BENEFITS

A stimulating career in an expanding, prestigious company, where individuals matter, particularly in terms of career objectives and personal achievement. The following features are part of the employment package which substantially increase gross salary figures:

- A competitive salary on a rising scale;
- Mortgage subsidy;
- Non-contributory pension scheme;
- Free Life Insurance and permanent health scheme;
- Generous relocation expenses.

JBA



Quality first

Opportunities for Software Professionals in Mini and Micro Systems

SALARIES TO £10,500

Informal interviews at our Head Office in Camberley from 17.30 — 21.00 hours on Tuesday, February 27.

SDL is a professional organisation with total system and software capability. To help meet the continuing high demands placed on our services, a considerable number of professionals are needed at Consultant, Engineer and Programmer levels.

We are holding informal interviews in our offices in Pembroke Broadway, Camberley on February 27 from 17.30 to 21.00 hours and we will be pleased to welcome anyone interested in learning more about our company and the rewarding careers offered.

If you can meet the challenge of intellectually stimulating and varied work with a leading well-established software and systems consultancy, specialising in mini and micro computer real-time applications, then please drop in for a drink and a chat with our managers and consultants. The office is adjacent to Camberley BR station.

Systems Designers staff benefit from a wide variety of experience both of project applications and of computer systems.

The company offers productivity bonus, insurance and pension schemes and assists with relocation if required.

Systems Designers staff benefit from a wide variety of experience both of project applications and of computer systems. Starting salary is negotiable up to £10,500 pa according to ability and experience.

The company offers productivity bonus, insurance and pension schemes and assists with relocation if required.

If you cannot make it to these informal interviews, telephone Bill Hockey, our Operations Director, on Camberley (0276) 62244, or write to him at:

Systems Designers Limited
Systems House
Pembroke Broadway
Camberley, Surrey GU18 3XH



Draftsman 1A

PROGRAMMERS up to £5,000+benefits

At least 18 months COBOL programming experience is required, ideally gained on systems incorporating real-time terminals and, preferably, a database. A background on Burroughs equipment will be an added bonus.

Programmers who are appointed will receive training and the opportunity to diversify experience on a variety of applications as their career develops.

SENIOR PROGRAMMERS up to £6,300+benefits

Candidates for these positions will have a number of years experience of programming on real-time terminal systems in COBOL. Particular experience on insurance, banking or financial applications will ensure serious consideration as will a knowledge of Burroughs equipment.

Successful candidates will assume a high degree of responsibility, after any initial training, and opportunities will exist for wide diversification. A knowledge of ALGOL will be useful for some vacancies.

SYSTEMS ANALYSTS up to £6,000+benefits

SENIOR SYSTEMS ANALYSTS up to £7,200+benefits

Systems Analysts with a track record in insurance or financial systems development will be particularly suitable. The company is dedicated towards terminal network processing with DMS2 and previous work in this type of system is very desirable. A programming background is not essential but deemed necessary for some of the vacancies.

Successful applicants will assume project responsibility within a short time, depending on the personal ability and skill of the individual.

SENIOR MANAGEMENT

SOFTWARE DEVELOPMENT W LONDON £10,000+

PROJECT LEADER	CITY	£9,500
SENIOR BUSINESS ANALYST	CITY	TO £9,300
PROJECT LEADER	ESSEX	£8,000+ Relocation
PROGRAMMING MANAGER	LONDON	£8,000+ BONUS
SYSTEMS ANALYST	LONDON	£7,000++ + Mortgage

International manufacturer seeks person for systems software environment. Building standard software with emphasis on quality. Supervisor with technical experience either with manufacturer or software house.

Development of major international message switch system. Project management coupled with MACRO ASSEMBLER, RSX and RTL experience overseas travel opportunities if desired.

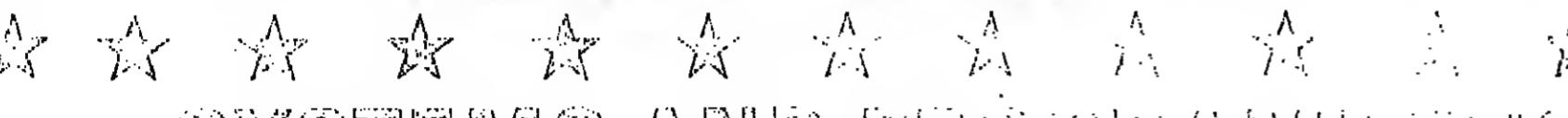
Evaluation, preparation of revisions and re-issues of systems strategy and project management. Must have good systems analysis and business experience.

This European group has openings for persons with leadership ability from ANY environment to work in real-time business and mini computer systems.

This major International company seeks programming manager with good COBOL experience preferably with CICS and PL/I. Position includes taking general control of programming section.

This major bank seeks person with at least 3 years systems analysis exp. Prefer ICL hardware and banking experience. Fantastic package which includes full banking benefits.

IF YOU WANT TO KNOW MORE ABOUT THESE POSTS OR ANY OF THE MANY OTHERS WE HAVE AVAILABLE -- THEN RING OUR SENIOR MANAGEMENT DIVISION FOR FURTHER DETAILS



SYSTEMS AND PROGRAMMING

PROGRAMMERS	LONDON	£7,000+ Perks	Major IBM installation utilising CICS and database seeks PL/I and/or ASSEMBLER programmers
ANALYST	SURREY	£6,500 + Sub Mort/perks	Analyst with good insurance business acumen and experience on ANY LARGE mainframe and perhaps involvement in major systems
SYSTEMS ANALYSTS	KENT	£7,000+ Perks	Excellent opportunity to join IBM 370 installation with T.P. monitor. All new development work on lineicel systems. Exciting plans for future.
ANALYSTS	C LONDON	£7,800 + Bonus + Perks	Rapidly expanding company with ICL hardware seeks systems analysis to work on major batch-processing systems. Can have exciting plans to evaluate new machinery and move into communications. FANTASTIC PROMOTION PROSPECTS.
PROGRAMMER	LONDON	£6,500+ Bonus + Perks	Go-ahead IBM installation seeks COBOL/DL/I programmers hopefully with knowledge of CICS, TSO or MVS. Can have plotting IBM 3031 shortly.
MINI PROGRAMMER	LONDON	£7,000+ Bonus	Minimum 1 year's BASIC + experience on any mini for major PDP11 installation. Rapidly growing concern with full expansion programme.

FOR EVERY ANALYST OR PROGRAMMER WE HAVE AN EXCELLENT VARIETY OF EXCITING NEW JOB OPPORTUNITIES — WHY NOT TELEPHONE OUR SYSTEMS AND PROGRAMMING DIVISION TO SEE WHAT WE HAVE FOR YOU.



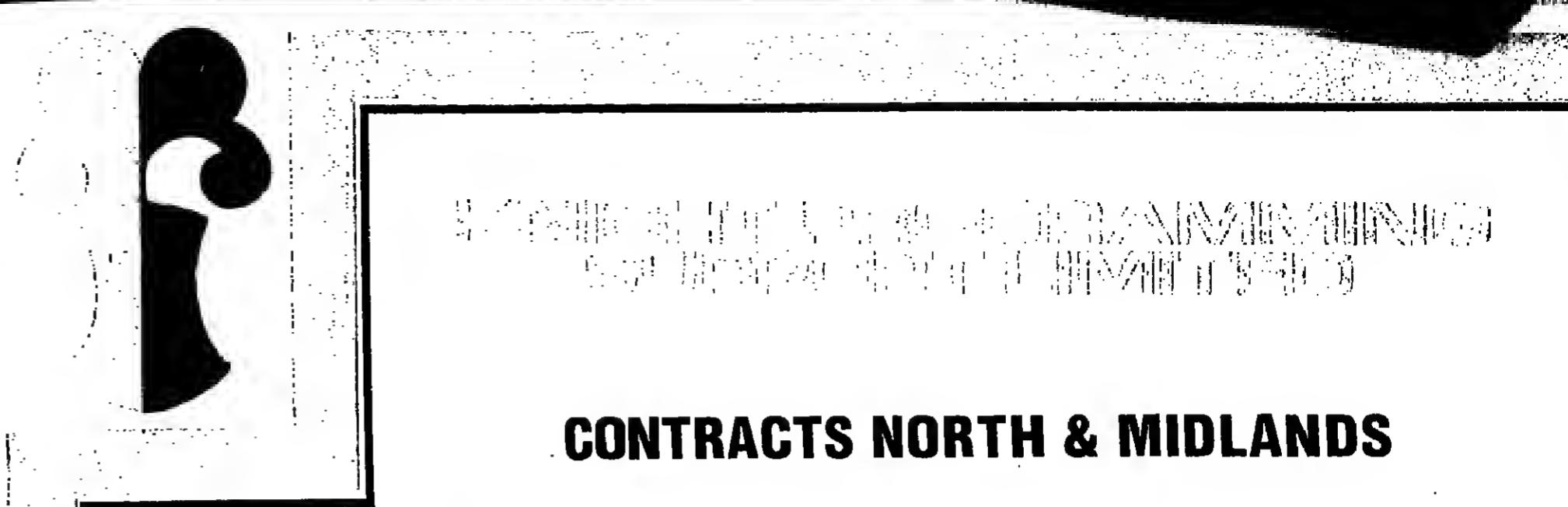
TRAINING OPPORTUNITIES

PROGRAMMERS	LONDON	TO £6,000	You want to get on to large IBM Mainframes — IBM mini/lin COBOL on any hardware is all you need for this major oil company.
PROGRAMMERS	LONDON	£5,500+ + Mortgage	This major BANK offers amazing PERKS to programmer with 18 months ICL COBOL exp. They are awaiting delivery of 2000's. All new development work! Do yourself a favour — phone now.
PROGRAMMERS	CITY	£5,000+ Negotiable	If you have 18 months any MINI ASSEMBLER — then this major International company with extensive OEC PDP hardware will train up to date technology and new software.
JUNIOR ANALYST PROGRAMMER	W LONDON/ TO BERKSHIRE	£6,500	Excellent opportunity for a programmer with 2 years' experience on IBM hardware ANY LANGUAGE to learn analysis.
GRADUATE TRAINEES	LONDON SURREY MIDDX	TO £4,500	We now have several opportunities for trainee programmers for training in application and technical programming on IBM, ICL and Mini machines.

EXPERIENCED PROGRAMMERS WITH A DESIRE TO LEARN NEW TECHNIQUES AND HARDWARE WHO WANT TO BECOME INVOLVED IN DATABASE, TP AND EVEN SYSTEMS — SPEAK TO OUR EXPERIENCED RECRUITMENT CONSULTANTS WHO WILL BE ABLE TO GIVE ADVICE WITHOUT OBLIGATION AND CAN PUT YOU ON THE ROAD TO A NEW CAREER.

KNIGHT PROGRAMMING SUPPORT LIMITED

ROYALTY HOUSE, 72 DEAN STREET, W1. 01-734 0152/3010 (24 hrs.)
RECRUITMENT AGENCY



CONTRACTS NORTH & MIDLANDS

IBM	c.£230
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CICS PL/I DL/I PROGRAMMERS NORTHWEST MIDLANDS	c.£230
IMB COBOL PROGRAMMERS MIDLANDS	c.£230
IMB OS/DC PL/I PROGRAMMERS MIDLANDS, NORTHWEST	c.£230
370 COBOL PROGRAMMERS MIDLANDS, NORTH	c.£220

ICL	.....	c.£215
1800 OII/OIII COBOL PROGRAMMERS NORTH, MIDLANDS	.....	c.£220
2980/70 VMEB/K FORTRAN PROGRAMMER NORTH	.....	c.£220
2903 COBOL PROGRAMMERS NORTHWEST	.....	c.£220
1900 FILETAB/COBOL PROGRAMMERS NORTHEAST, NORTHWEST, MIDLANDS	.....	c.£220

OTHERS	.....	c.£220
HONEYWELL COBOL PROGRAMMERS MIDLANDS, NORTHWEST, SCOTLAND	.....	c.£220
HONEYWELL LBB PROGRAMMERS MIDLANDS	.....	c.£220
UNIVAC COBOL PROGRAMMERS NORTH, MIDLANDS	.....	c.£220
PDP 11 BASIC PROGRAMMERS MIDLANDS, NORTHWEST	.....	c.£220
BURROUGHS PROGRAMMERS MIDLANDS, NORTHWEST	.....	c.£230

FOR DETAILS OF THESE AND OTHER CONTRACTS PLEASE CONTACT PERRY BUTLER/JUDY LEES ON 061-833 9341/5

★ High remuneration assured throughout the year

★ Security of employment from continuity of work

★ Career development from learning new DP techniques

★ Overseas opportunities

★ Financial advice in all matters of taxation, mortgages, pensions

PERMANENT OPPORTUNITIES

PROJECT CONTROLLER LIVERPOOL to £7000

Responsibility for all projects and continuing development of important manufacturing systems. The company currently an IBM 370 with COBOL and introducing new IBM hardware. Knowledge of ASSEMBLER and DATABASE would be an advantage. Relocation expenses and fringe benefits offered. Ref. 1088.

COBOL PROGRAMMER

LEEDS to £5712 A self-financing productivity bonus and relocation expenses are among the benefits offered by this company. They are currently on an ICL 19045 under GEORGE THREE but are introducing new ICL hardware to be run under VMEB. Applications are of a financial and commercial nature. Promotion prospects are excellent. Ref. 1071.

SENIOR SYSTEMS ANALYST

INVERNESS c£7000 An opportunity for a programmer to advance to a senior level and control a major project. Our client is moving site to a Birmingham location and require a senior programmer to control the move. An ICL 1903T with COBOL and PLAN in operation. Experience in the relevant hardware and language is necessary. Knowledge of FTLB or TAB END would be an advantage. Ref. 1084.

SYSTEMS PROGRAMMER LOCH LOMOND c£6000

Assembler systems programmers with an IBM background required to become involved in IMF, DL1, DATA COMMUNICATIONS and DATA Dictionary. Position involves liaison with high level users and applications are mainly commercial. Will train applications programmer. Productivity bonus, and relocation expenses are offered. Pay rate is very reasonable in this area. Ref. 1088.

SYSTEMS ANALYSTS LOCH LOMOND c£6500

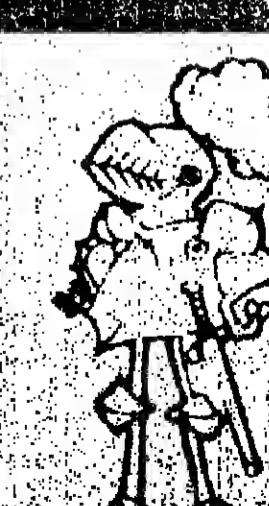
A production role and relocation expenses are offered by our client and pay rates in this area are very reasonable. Two years' experience in financial applications is required and an IBM background with ASSEMBLER knowledge would be an advantage. This analyst will become involved in IMS and additional training will be given in DATABASE where necessary. Ref. 1087.

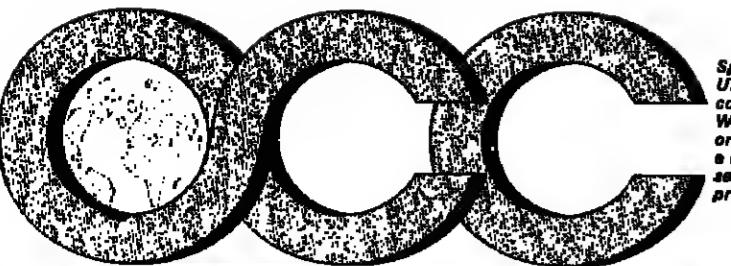
PROGRAMMER

SIRKINGHAM c£6200 An opportunity for a programmer to advance to a senior level and control a major project. Our client is moving site to a Birmingham location and require a senior programmer to control the move. An ICL 1903T with COBOL and PLAN in operation. Experience in the relevant hardware and language is necessary. Knowledge of FTLB or TAB END would be an advantage. Ref. 1088.

FOR DETAILS OF THESE AND OTHER VACANCIES PLEASE CONTACT JOAN JOHNSTONE ON 061-833 9341

143/144 ROYAL EXCHANGE, MANCHESTER
TELEPHONE NO. 061-833 9341/5. MIDLANDS 021-236 1794, Extension 223.





Specialists since 1971 in
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service to computer
professionals.

Reading

Consultants and Project Managers	£6,500-£9,500
Analysts	£5,500-£9,500
Programmers	£4,000-£7,500

A major UK Software House is rapidly expanding its operation in the Reading area. The positions are based in Reading but there are also many other vacancies in London and Wilmslow.

Most of the projects will deal with the development and implementation of commercial applications with a certain amount of government work. Opportunities also exist to work on the development of Real Time Systems.

Senior candidates should have extensive experience in commercial systems development or may be specialists in an application or technical area.

Programmers and Analysts will work on a variety of computer systems ranging from medium size i.e. ICL 2903 to larger IBM or ICL systems.

For an informal discussion and to apply for any of the above positions, please contact Renee Nutt or Fran Setter on 01-242 9356 (day) or 01-874 6372 (evenings and weekends). Ref: 504/CW.

OCC Computer Personnel Limited,
18 Bedford Row,
London WC1R 4EB,
Telephone: 01-242 9366



Software Development Manager

London

£10-12,000 + car

Proven record of leading a team which meets its time and cost promises. The location is close to the City of London; prospects are excellent, depending on the results of the individual and the company as a whole. Initial salary and conditions of work are truly negotiable — but are expected to include a £10-12,000 salary and a car. PA Personnel Services

Ref: MV916774/CW

Initial interviews are conducted by PA Consultants. No details are divulged to clients without prior permission. Please send brief career details or write for an application form, quoting the reference number on both your letter and envelope, and advise us if you have recently made any other applications to PA Personnel Services.

PA Personnel Services

Hyde Park House, 60a Knightsbridge, London SW1X 7LE. Tel: 01-235 6060 Telex: 27874



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- Network Computer Systems
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- Systems Programmer
- Software Engineer

and enjoy a varied, interesting and rewarding life as a consultant with CAPP ASSOCIATES — a leading group in the DP Personnel field, enjoying an excellent reputation.

CROYDON AND WILMSLOW OFFICES

£12,000 p.a.

A period of training and familiarisation will be provided to quickly reach full competence and to continue personal development. Our consultants are fully responsible for their own achievements with closely linked rewards made up of salary, bonuses and expenses; company cars are provided at the more senior levels.

The company's success over the last 6 years has resulted in moving into a prestige head office as a prelude to further expansion. The growth creates opportunities for consulting to join us and we want to consider people who have the personality and attitude with background to join teams in both our offices working with a growing number of customers.

Our directors would like to discuss the opportunities if you have an interest in or desire to work with people and feel that recruitment offers a new way of life — the rewards are in the work itself but satisfying and you make friends. Contact us now as our requirements are immediate.

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below QUOTE REFERENCE

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LONDON AND MANCHESTER

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MYRIAD

BORED WITH COMMERCIAL SYSTEMS? CHANGE TO REAL-TIME ENGINEERING APPLICATIONS

£4000-£7500

N.W. SURREY

Due to the continued success of our client's operations, we are recruiting a range of computer personnel for a wide variety of development projects. The majority of systems are concerned with engineering, electronic or scientific applications on both mainframes and minis, with many projects utilising real-time facilities. Persons joining the company now can expect a most interesting and rewarding future in a high technology environment.

If you have one (or more) of the following:

- ★ AN ELECTRICAL ENGINEERING QUALIFICATION
- ★ CORAL 66/FORTRAN/ASSEMBLER
- ★ DATA BASE MANAGEMENT SYSTEMS
- ★ ON-LINE STOCK CONTROL

our client can offer these positions:

- ★ PROGRAMMER
- ★ ANALYST/PROGRAMMER
- ★ SYSTEM SUPPORT PROGRAMMER

- ★ BURROUGHS/DEC/U/C EQUIPMENT
- ★ CROSS-ASSEMBLER
- ★ NETWORK COMPUTER SYSTEMS
- ★ MINI COMPUTER EXPERIENCE
- ★ SOFTWARE AUTHOR
- ★ SYSTEMS PROGRAMMER
- ★ SOFTWARE ENGINEER

Salaries will be commensurate with experience but should not prove a problem to persons wishing to join the company. Located in the attractive countryside of Surrey, the modern offices are well serviced by three British Rail stations and there is a large car-park next to the building.

Ref: S2/2202

MYRIAD APPOINTMENTS LIMITED

30 Fleet Street London EC4Y 1AA
01-353 0981 24 HRS.

Jacquard Systems

Manufacturers of sophisticated Virtual Computer systems used for word and data processing applications

Computer Engineer

Up to £7,500 + car

The successful applicant will be able to show 3 to 4 years experience as a customer engineer working to component level in the following areas:

- + Mini/Micro Computers
- + Disk Drives
- + Printers
- + Communications

Based at High Wycombe, you will have the opportunity to travel in the UK and Europe. Benefits include non contributory pension, free life insurance, BUPA membership. Please send your cv to, or request an application form from, R. Bridges (printing information RB/W/23)

Jean Dennington Limited

Personnel Consultants,
14 New Burlington Street, London W1X 1FF
Tel: 01-734 8134

COMPUTER PROGRAMMER

Required by NALGO. Salary within range £4926-£6754 p.a. plus £312 p.a. supplement and £435 p.a. London Weighting according to experience and qualifications. To work on ICL 2904 (40K, Tepes, EDS 60s and DDEs). Applicants should have had two years' experience of Cobol.

Staff restaurant. Minimum 23 days annual leave and additional leave at bank holidays. Partial mortgage interest rebate.

Application form from the General Secretary, NALGO, 1 Mabledon Place, London WC1H 9AJ.

St. James Press COBOL/ASSEMBLER PROGRAMMERS £5,000+

We are looking for Programmers with at least one year's experience, ideally in an IBM environment, with COBOL and/or Assembler background.

Our location is in the City of London. We are technical publishers with particular emphasis on the travel trade and an interesting and varied work in a congenial atmosphere, age is not material.

Write now with brief career details to:

Mrs. Annebel Stein,
St. James Press Ltd.,
1 St. James's Street,
London SW1A 1EP,
on telephone: 01-730 5187.

Owing to expansion and the introduction of two-shift working, the following posts have been created within our Computer Operations Department which is using an IBM 370/138 running under OS/VS, POWER/VS, CICS and VSAM.

SENIOR OPERATOR/CONTROLLER

Ref: CW1/167

From £5188 p.a. inc.

Will be responsible to the Production Controller for the hour-by-hour operation of the Computer Room and Work Control sites.

We are looking for someone with at least two years' related operating experience — one of which must have been in the capacity of Senior Operator — a good knowledge of JCL and Work Control procedures.

OPERATOR/CONTROLLER

Ref: CW1/188

From £4102 p.e. inc.

For this post we are looking for someone with a minimum of one year's operating experience. A knowledge of work control procedures and DOS JCL would be a decided advantage.

Both posts have a minimum of 22 days' leave per year and we have a subsidised restaurant and a Sports and Social Club.

The Royal Borough of KENSINGTON AND CHELSEA

Application form quoting appropriate reference number from the Establishment Officer, Dept. 151, The Town Hall, Hornton Street, Kensington W8 7NX. Tel: 01-937 8862 (24-hour answering service). Application form to be returned by 2nd March, 1978.

The council welcomes applications from suitably qualified registered disabled persons.

HIGHLAND HEALTH BOARD TREASURER'S DEPARTMENT OPERATIONS MANAGER Salary Scale: £4421-£5328

Applications are invited for the above post in the Computer Services Unit which is situated in the grounds of Hilton Hospital at Inverness.

The current workload encompasses a wide variety of financial, together with some medical applications, all of which are processed on an ICL 2904 running under Executive 2.

Applicants should currently be employed at senior operator level or above, preferably working with ICL computers.

The successful applicant will be responsible to the Computer Manager, for planning and controlling the work of the Operations Department.

Application forms and further particulars may be obtained from the Personnel Officer, Highland Health Board, Royal Road, Inverness IV2 3HG, and should be returned not later than 8 March, 1978.

Gold Helm Executive Appointments
20 Grosvenor Gardens, London SW1W 0PS
Telephone Bath (029) 380311

SYSTEMS ANALYSTS PROGRAMMERS OPERATORS

OFF COURSE?

We want to steer you on the right career course for 1979.

We are a new company based in Bath, and covering D.P. recruitment throughout the West Country.

Our consultants are in contact with a variety of computer installations, suppliers and software houses, ready to discuss your job needs and available to advise you on schools and housing in the area.

All it needs to set you back on course is to write or telephone:

PAM WEBB on 0225 330311

The University of Sussex Computing Centre

Advisory Applications Programmer

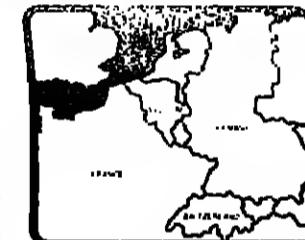
The Centre is seeking to recruit a graduate programmer to join the existing small team in an advisory role. The post involves advising users of the Computing Service in programming, drafting user documentation, and giving tutorials to users. Further details are available on request.

The Centre provides services on a local ICL 1904S system and on DDC 7800 systems in Manchester and London.

The appointment will be within the faculty. Other Related Grade 1A — £3,883 to £5,595 p.a. according to age, qualifications and experience.

Applications, giving two references, should be sent to the Staff Records and Recruitment Officer, Sussex House, University of Sussex, Falmer, Brighton BN1 9RH, to arrive by Friday, 2nd March, 1978.

IBM European Assignments



with COS, an established consultancy with offices in the UK & Switzerland. These assignments are representative of our contracts with internationally respected clients, and are on a 6-monthly renewable basis.

IMS Systems Programmer

To be responsible for setting up IMS on an OS/VS1 installation in Holland and for subsequent generation, maintenance and system tuning. Applicants should have solid IMS experience (although not necessarily under VS1) and will have performed at least one

£20,000+

PER ANNUM

IMS Specialist

To act as advisor to the application development groups of an international company in Holland on all aspects of IMS DB/DC design and implementation.

£20,000+

PER ANNUM



IBM EUROPEAN ASSIGNMENTS

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RG11 2BB,
Tel: (0734) 791225
Telex: 847317

COBOL PROGRAMMER BASINGSTOKE, HANTS

A vacancy exists for a Programmer with experience in IBM COBOL to OS/VS1. Knowledge of JCL would be an advantage.

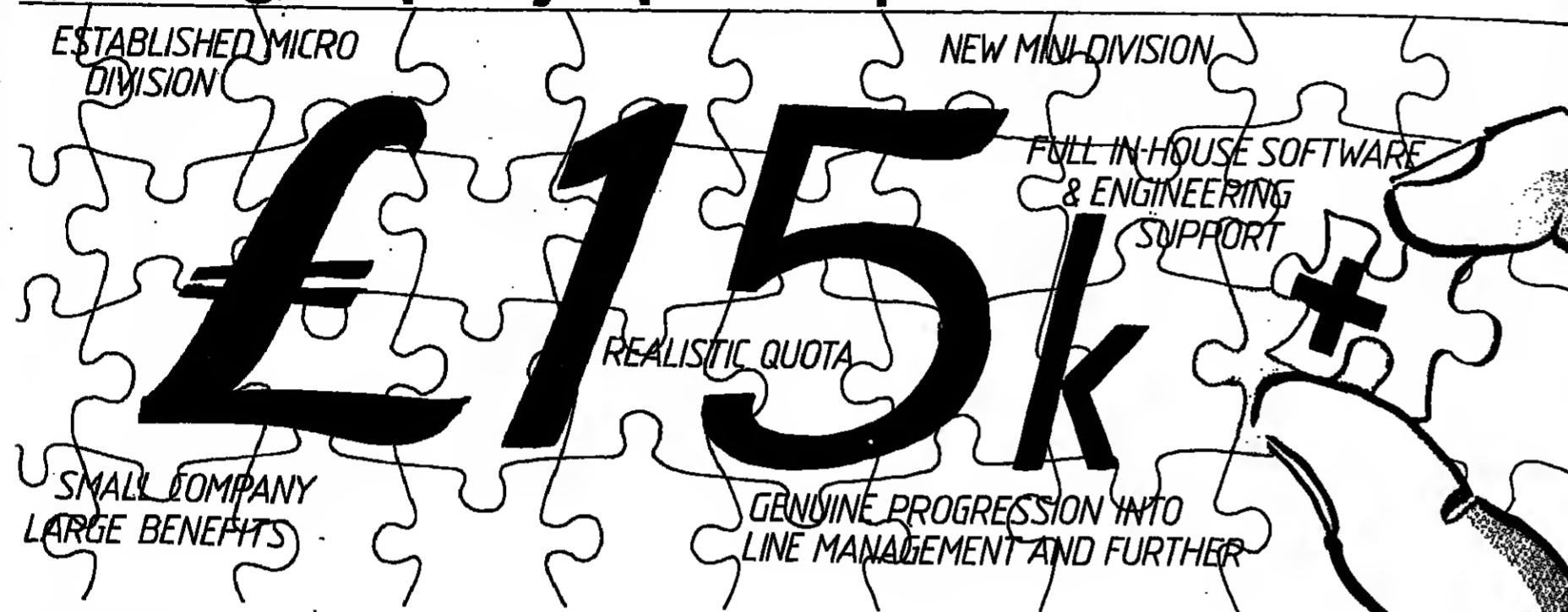
Employment benefits are those associated with a large engineering company and include subsidised canteen, four-week annual holiday, pension and life assurance, sick pay scheme, active sports and social club.

Apply to Personnel Department, Eaton Ltd., Transmission Div., Worthing Road, Basingstoke, Hants. Tel: Basingstoke 3221 ext 237.

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

When you put all the pieces together,
you've got a pretty impressive picture



MANAGEMENT &
EXECUTIVE SELECTION

Contact Tony McGrath

Suite 201/6, Albany House, 324 Regent Street, London W1R 5AA 01-637 9611

HARDWARE ENGINEERING SPECIALISTS

£22-£25K (This is salary NOT the total package)

PUT YOUR ENGINEERING KNOWLEDGE AND PROFESSIONALISM TO GOOD USE IN EUROPE.

JOIN OUR CLIENTS WHO HAVE A NEED FOR A NUMBER OF HARDWARE SPECIALISTS, EXPERIENCED IN THE FOLLOWING DISCIPLINES TO LIVE AND WORK IN EUROPE.

1) **DISK DRIVE** Specialist, who is an in-depth Technical Expert on Drives and Controllers, with experience specifically allied to IBM 360/370 Mainframe Systems.

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3) **COMMUNICATIONS** Specialist, who will have an in-depth general background in all aspects of DATA COMMUNICATIONS, and although this position does not necessitate an IBM background, a knowledge of S.D.L.C. protocol and S.N.A. would be advantageous.

You will be working for a large and prosperous Company who can offer excellent career opportunities for ENGINEERS with a MATURE outlook and the ambition to capitalise on their specialist knowledge.

In the first instance call us quoting REF. JMC/10.



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THE SPECIALISTS IN COMPUTER ENGINEERING OPPORTUNITIES
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COMPUTER BUSINESS/SYSTEMS ANALYST DUBLIN

Our client, one of the largest Industrial Groups in Ireland, with diversified business interests, wishes to appoint a Business/Systems Analyst.

They currently operate an IBM 370 Computer System and will soon begin to install a distributed processing network, utilising interactive Minicomputer Systems.

The successful candidate will work very much as a Client/User representative implementing dynamic systems for a progressive management team.

Ideally he should be a bright and well motivated computer professional with sound business experience and should have:

- 4/5 years Analyst/Programmer experience (at least 2 of them with on-line applications)
- Implemented major projects.
- Ability to communicate well with Users.

THE REWARDS:

In addition to a variety of work in a progressive environment, you will receive an attractive salary. Fringe benefits are first-class and include career development, training and non-contributory pension. Relocation assistance will be available where appropriate.

All applications will be strictly confidential and your identity will not be disclosed to our client without your prior consent.

Telephone/Write NOW to Pat Rafter or Eamonn Coopar — Quota Reference No. CW19.



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33 Mespil Road, Dublin 4
Telephone 681168, 681277

IRELAND'S FOREMOST PERSONNEL CONSULTANTS
TO THE COMPUTER INDUSTRY



Insight Marketing and Personnel Consultants
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Computing in British Gas

As part of the increased emphasis which British Gas is placing on computing, applicants for two senior posts are being sought. British Gas makes extensive use of computers, both in serving the needs of its 14 million customers and in tackling its scientific, administrative and management information requirements. It has substantial investment in large mainframe computers at 12 Regional and 2 Headquarters sites.

Computer Services Manager

Based at Fulham up to £11,000

The Computer Services Manager will head the Corporation's Headquarters Computer Department at Fulham. The Department has a Univac 1108 computer which handles a mixed on-demand and batch work-load but the installation of a more powerful computer and enhanced accommodation is planned. As well as serving the Corporation's London Headquarters' operational and software development needs, there is a requirement for the Department to make a substantial contribution to computer development throughout the Industry.

Applicants should be graduates and/or have an appropriate professional qualification. Extensive computer experience is required, together with proven managerial ability in a computer environment. (Ref. 145/1).

Computer Policy Manager

Based at Holborn up to £11,000

The Computer Policy Manager will lead a small team in formulating, assessing, monitoring and presenting the Corporation's hardware strategy and computer development plans.

Applicants should be graduates and/or have an appropriate professional qualification. Extensive technical computer experience is required, together with innovative skills and demonstrable planning judgement. The post requires a tactful and articulate person with proven ability in successfully communicating with senior management. (Ref. 145/2).

Applications from men and women giving personal details and full information on qualifications and experience should be addressed, quoting the appropriate reference number, to the Personnel Manager, British Gas Corporation, 39 Bryanston Street, London W1A 2AZ, in care of pvtb1.

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London EC2
Tuesday 27th Feb.
Noon - 0.30 pm

George Hotel
High Street, Colchester
Monday 26th Feb.
5.00 - 8.30 pm

Mercury Motor Inn
(formerly Fairlane Motor Hotel)
Southend Arterial Road,
Romford, Essex
Tuesday 27th Feb.
5.00 - 8.30 pm

Saxon Motor Inn
Southern Way,
Harlow, Essex
Wednesday 28th Feb.
5.00 - 8.30 pm

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Rainsford Road,
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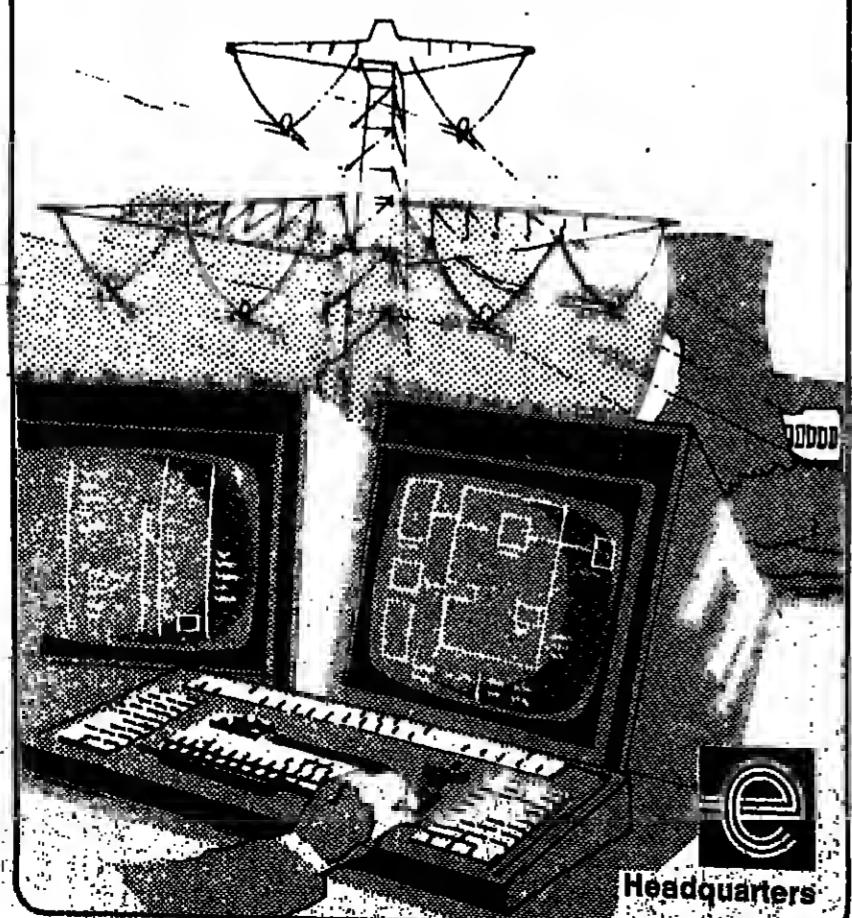
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Operational Directorate

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UNILEVER COMPUTER SERVICES LIMITED

**MINISTRY OF DEFENCE
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FARNBOROUGH, HANTS**

Higher Scientific Officer/ Scientific Officer

(Computer Programmer/System Analyst)
(part-time appointment)

For Applied Physiology and Field Trials Division

A Higher Scientific Officer (or Scientific Officer) is required for a period of 3 years to assist staff studying the factors affecting human performance in the military environment. The post will be held by a person of independent character who can work in an inter-disciplinary team without close supervision. The successful candidate will be responsible for the development and use of techniques to collect and analyse data obtained in experiments on human subjects. Present facilities for data handling include both digital and analogue computers with appropriate peripherals (e.g. a POP11/34 on site and access to an ICL 1900). It is expected that a wide range of challenging problems will be generated by the rapidly expanding research programme. The major areas of current work include noise, vibration and thermal stresses; musculo-skeletal problems of operating vehicles and weapons; exercise; and the physiological and ergonomic evaluation of protective clothing systems.

QUALIFICATIONS AND EXPERIENCE:
Degree, HNC/HNC or equivalent, in computing sciences or a related discipline and several years' experience of the application of computing techniques. Some contact with the evaluation of physiological and environmental data would be an advantage.

AGE:
Normally under 30

SALARY:
Appointment for a fixed period of three years as Higher Scientific Officer (£4100-£5448) or Scientific Officer (£2840-£4145) according to age and qualifications.

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£10,000 (Tax Free) plus commission

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Candidates aged up to 35 years must be experienced within the computer & mini-computer applications, Data Collection, Communications Control, Configuration of Processors and have good appreciation use of Software Systems in Batch and Real Time. Really candidates should have a high level of COBOL and/or FORTRAN languages.

Contract offered will be for one year in the first instance on single or bachelor status and other conditions to include provision of motor car, free furnished accommodation, free medical arrangements, U.K. leave, etc.

Please write quoting ref: 4/CW/1 and giving details of qualifications, experience and domestic circumstances to Michael R. Andrews, Executive Resources International, 114 Office, 87 Jermyn Street, London SW1Y 4JD or telephone 01-839 4788 for an application form. Short listed applicants will be notified within three weeks.

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ICL	GH	Star Op	2 yrs	£4600
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H.WELL	GCOS	Operator	6 mths	£3800
UNIVAC	ANY	Star Op	1½ yrs	£4800
UNIVAC	EXEC 8	Jnr Op	8 mths	£4000
UNIVAC	EXEC 8	Operator	2 yrs	£5700
NCR	DS3	Star Op	1½ yrs	£4800
NCR	DS3	Operator	1 yr	£4200
NCR	DS/84	Star Op	8 mths	£4000
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Contract offered will be for one year in the first instance on single or bachelor status and other conditions to include provision of motor car, free furnished accommodation, free medical arrangements, U.K. leave, etc.

For further details or an application form please write or telephone (01-303 7777 ext. 782), O. Jarvis, Operations Manager, Data Processing Department, 8 Brempton Road, Bexleyheath, Kent DA7 2EZ.

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We offer a career challenge and the opportunity to put computers to actuarial work. Benefits from working with us include, career development within a multi-national concern, four weeks annual leave, sport and social facilities, and assistance with relocation.

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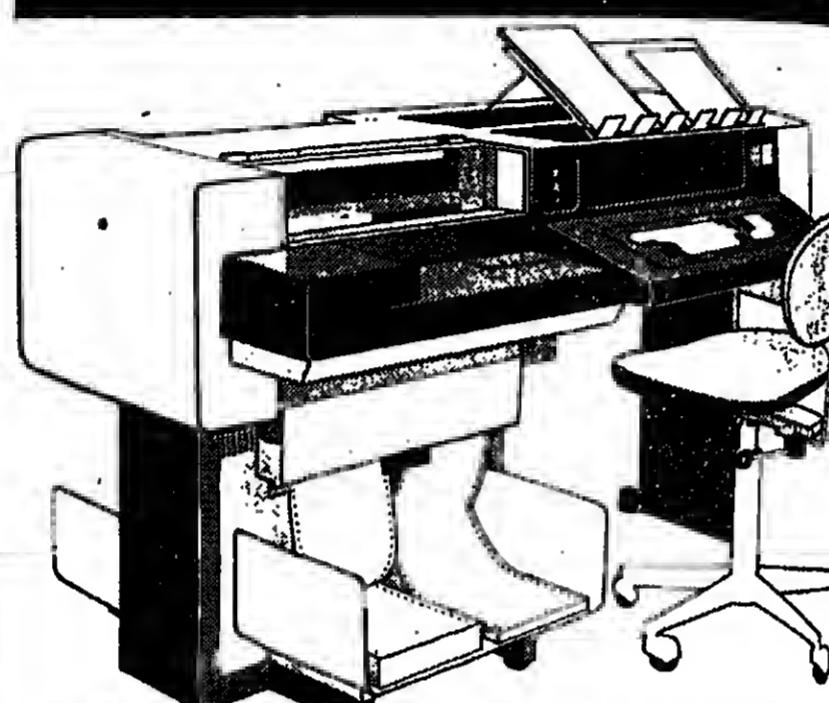
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Our growth provides excellent career prospects, so if you've got at least 4 years experience in field engineering, and a desire for overseas travel, write or telephone for an application form to Marlon Barnes, Redfon Computers Ltd, Kelvin Way, Crawley, Sussex RH2 2LY. Telephone: Crawley (0283) 31211 Ext. 278.

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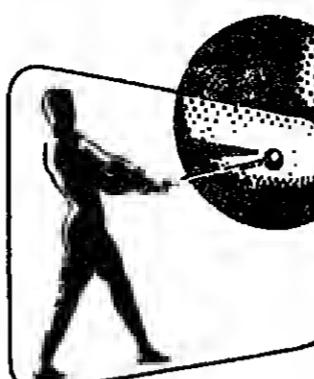
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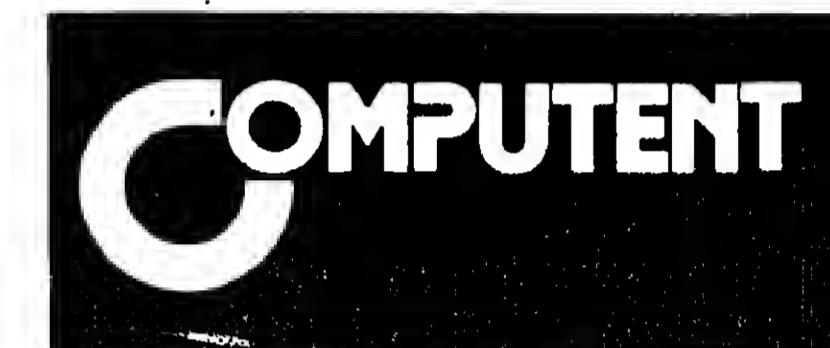
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Project Leader, salary range £7500-£9263 p.a. plus £480 p.a. for overtime and £100 per day for the use of the Unit and director in his absence. 1 Senior Programmer, salary range £6317-£7764 p.a. plus £450 p.a. for overtime and £100 per day for the use of the Unit and director in his absence. All salary ranges are under review. Suitable qualified persons are invited to apply to: Dr D. Parkinson, Queen Mary College, Mile End Road, London E1 4NS within 14 days of the appearance of this advertisement.

JUNIOR JOINT COMPUTER COMMITTEE SYSTEMS ANALYST/PROGRAMMER £4,773-£5,658 p.a. incl. (AFB/BOL)

The position requires a knowledge of the Novell 82740 on behalf of the Thanet and Dover District Councils and consideration is being given to the use of online applications by both user numbers and a suitable number of terminals in each location. To assist in developing existing systems and developing new systems.

Applicants should preferably have a sound knowledge of systems analysis and programming. In addition, the following qualifications will be given to: housing accommodation and a generous disturbance allowance scheme in operation.

Applications giving full details of experience to: Mr G. J. Morris, Manager, The Joint Computer Centre, Mile End Road, Queen Mary College, Mile End Road, London E1 4NS, Tel: (01) 42951.

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The Daresbury Laboratory, located in the Cheshire countryside, is developing major national facilities for research into atomic, molecular, solid state and nuclear physics. Exploitation of these facilities requires first class computing support. Computers at the Laboratory include an IBM 370/165, GEC 4070's, PDP 11's and Inetdata's

We are looking for young people, male or female, to fill vacancies in the User Support Group which is responsible for providing general support for users of our computing facilities. Previous experience of computing is advantageous but not essential as training will be provided.

Appointment will be made at one of two levels depending on qualifications and experience:

(a) Scientific Officer - applicants should possess a good honours degree in a relevant subject.

Salary: £4,773-£5,658 p.a. incl. (AFB/BOL).

(b) Higher Scientific Officer - applicants should possess a good honours degree in a relevant subject, plus at least 2 years post-graduate experience.

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There is a generous leave allowance and a non contributory pension scheme for both grades. The laboratory also operates a flexible working hours scheme.

Closing date: 23rd March, 1979.

Application forms can be obtained by telephoning Warrington 66000 Ext. 467 or writing, quoting reference number D1/680/W10.

The Personnel Officer
DARESBURY LABORATORY
Science Research Council
Daresbury, Warrington WA4 4AD

2/1/79 1/1/80

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Redifon Computers, the second largest British-owned Computer manufacturer, is starting a major new expansion programme. This will complement an existing programme that has led to eightfold growth in the last five years.

Career-minded people are now needed throughout the U.K. for marketing appointments.

Are you eligible?

2 years' successful experience selling computers?

Good educational background?

Currently earning £9,000-£10,000 p.a.?

Clean driving licence?

Ambitious?

Tick the questions. If you score 4 out of 5 you could be selling the R-Range of data entry

and distributed data processing computer systems within months.

More than that, you could be established in a fast career development plan—backed up by thorough sales, marketing, technical and management training—with the British company.

Don't miss this opportunity to talk about your future. Call today:

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Major accounts and Financial Institutions in all areas.

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Member Company of the Rediffusion Organisation

Camden's Growing!
Get in Now!

Engineers and Programmers

Join a firm that cares for its staff, offers good career prospects and helps you exploit your abilities. Do satisfying and interesting work on defence projects, including:

Avionic Digital Systems

Applications are invited for a variety of posts:
***Project Management *Systems Analysis
*Electronic, Logic and Mechanical Design
*Programming**

Avionics experience would help but is not essential. Posts are available at our existing premises at Brecknell and Cwmbran and are open to male and female applicants.

Please write, or 'phone, for an application form to:

The Personnel Department, Ferranti Computer Systems Limited, Western Road, Bracknell, Berkshire RG12 1RA. Tel: Bracknell (0344) 3232. Please quote ref. no. G/10/CW.

FERRANTI
Computer Systems

SYSTEMS ANALYST Real-Time Planning

London

up to £6739

The Environment

A Systems Planning section responsible for the development of a large real-time telemetry system which assists in controlling the National Natural Gas Transmission Grid.

The Job

Defining and documenting in detail the plans for the development of the system and its software, for up to 5 years ahead.

The Person

- At least 'A' level, preferably an Honours degree in a Mathematical/Scientific discipline.
- Several years' programming and analysis design of real-time process control systems is essential.
- Some knowledge of large computer systems is desirable.

Salary range £5,253 - £6,237 plus £502 Inner London Weighting plus current self-financing productivity payment.

If this post interests you please ring David Pyatt, on 01-831 6272 ext. 4192 or write giving full details of age, experience, qualifications and current salary, quoting RS/616901 (705) CW, to the Senior Personnel Officer (Hinkley), British Gas, 59 Brymaston Street, London W1A 2AZ.

FIELD SERVICE ENGINEER

Start £5,500 plus car plus

London Weighting plus O.T.

A market leader in the Mini-Computer Systems field is expanding in this country and abroad. The growing business lead to new opportunities in LONDON, NORTH COUNTRIES and MIDLANDS.

You will have the chance to work with a hospitable, friendly team, on

Mac Computers with an international reputation and to earn the rewards and recognition that go with career progress. You will enjoy training and experience on modern, powerful computers—meeting people—solving problems on your own initiative and enjoying financial benefits. Start £5,500 paid overtime. London weighting, company car, non-contributory pension scheme. Call today but hurry. Ref. E.C.2140 (Consultant).

AD EXECUTIVE (KINGSTON) LTD. 01-546 9473

BRITISH GAS

ENGINEERS·PROGRAMMERS·SYSTEMS ANALYSTS·OPERATORS

"The ladder to success is through selling"

"Get into sales, get to the top"

"Most top people started in sales"

It's true, we've proved it!

Many of our friends now Company Directors/General Managers, began their career as an Engineer or Programmer, and owe their position today to a successful sales record.

Have you considered a sales career? You will need two important ingredients: the will to succeed and an organisation prepared to provide professional training. We have the experience to identify your sales potential, and a client prepared to offer formal training to enable you to capitalise on your potential.

Our clients are a multi million ££ BRITISH company — MARKET LEADERS in their field — enjoying outstanding business growth. The investment they are prepared to make in your future include: a base salary of at least £3K, substantial income guarantees, company car, and an income potential of c. £15K after training. You should be aged between 22 and 35, articulate, numerate, and "open minded" enough to talk to our career adviser for an immediate assessment and, if successful, an introduction to our clients. Telephone immediately for a discussion — Ref. DS-4.



Insight Marketing & Personnel Consultants Ltd.
72-75 Marylebone High Street, London, W1M 4AJ
Telephone: 01-486 5644

ANALYST/PROGRAMMER

POWER STATION SIMULATION

The North Eastern Region of the Central Electricity Generating Board designs Real Time Operator training simulators of power station plant at their premises in central Leeds. The simulators are for installation in Electricity Authorities both in the United Kingdom and throughout the world.

IF YOU HAVE:

A sound working knowledge of FORTRAN.
The ability to communicate effectively with engineers of other disciplines.
BCS Parts I and II or an appropriate degree.
A broad interest in engineering.

SALARY RANGE: £4231 to £5215 p.a. Point of entry depending on qualification, experience and training.

HOW TO APPLY: Please write giving brief details of qualifications, experience and salary to:



CENTRAL ELECTRICITY GENERATING BOARD — NORTH EASTERN REGION

LONDON BOROUGH OF HAVENING
Borough Engineer and Surveyor's Division

**SENIOR
ENGINEERING
TECHNICIAN**
Grade Tech 4/6
£4530-£6366

Applicants should have HNC in Civil Engineering or a recognised equivalent and have experience in working in a transportation team, report writing and in using a transposition package including the running of computer programmes.

Assistance with temporary housing accommodation and removal expenses will be considered.

Application forms and further details from the Borough Engineer and Surveyor, Technical Offices, Spital Road, Harrow, Middlesex HA1 2UD to be returned by Friday, 9th March, 1979.

Systems Analysts

We are
—The Computer Services Division of the Bank providing On-Line and Batch Services to 400 branches as well as to Head Office Departments and Subsidiaries
—Currently processing on 2 X IBM 158's, 1 X IBM 155

—On the threshold of extensive new developments
—Due to occupy a new purpose built computer centre in Mid '79

We offer
—The opportunity to work hard in one of Europe's most beautiful cities in congenial surroundings with professional colleagues
—Starting salary not less than £4,953 and (where appropriate) attractive House Purchase Facilities

—Non contributory pension scheme
—22 days holiday
—Continuing training
—Flexible working hours

We require
—A Degree or equivalent Professional Qualification
—A minimum of 2 years experience in the investigation, design and implementation of commercial D.P. systems

If you are interested, write for an application form to:

Mrs. M.C. Pinkerton,
Assistant Staff Controller,
Bank of Scotland,
2 Robertson Avenue,
EDINBURGH EH11 1PZ
Telephone: 031-337 2488 (extension 186)

OPERATIONS

SUPPORT OFFICER SALARY TO £4581 NEW ICL 2970 INSTALLATION

Applications are invited for staff to join our newly created Computer Services Division which will house a 2 megabyte ICL 2970 planned for installation in the near future.

The successful candidate will have a sound Operations and Technical background, with the ability to communicate with Users and System Development staff.

He/she will be responsible to the Operations Support Group Leader for providing technical backup to the Operations Section in a high pressure installation. Ideally applicants will have experience of working in a large multi programming environment.

This post carries a Contributory Pension.

If you are an ambitious person keen to develop your technical and personal skills, telephone 01-701 2670 (ansys 24-hour service) or write to: The Personnel Officer, London Borough of Southwark, 27 Peckham Road, London SE5 8UB. Quoting ref. CV/6-1065 and job title. Closing date 6.3.79.

COMPUTER CAREERS IN AUSTRALIA

Challenge!

For details and brochure write to Computer Careers in Australia Agent-General for Victoria, Victoria House, Strand, London WC2B 4LG.

CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday. Ring David Abbey for further details on 01-261 8016.

**BANK OF SCOTLAND
COMPUTER SERVICES
DIVISION**

14/1/79 11:50

JBA**Systems Consultants****London based**

up to £9,000
Our client, one of the largest systems houses in Europe, wishes to recruit a number of consultants to work on the development of commercial and communications systems. Candidates must have at least five years experience in the design and development of applications, preferably in finance or production. Recent experience with teleprocessing systems on large ICL 2900's or Honeywell L66 would be a distinct advantage.

The company offer the chance to work with professionals on sophisticated projects in a number of locations throughout the UK and the Continent.

Contact: Jim Baker

Computer Manager**London SW1**

£8,000 - £9,000 + car
This well known and highly successful international publishing house is about to embark on a new phase of d.p. development, involving the installation of new mini computers to deal initially with subscription and accounting systems. Candidates must have a sound background in systems analysis and design, together with a minimum of two years experience in project management. Technically, expertise must cover recent use of mini-computers and include a good understanding of communications.

An excellent package is offered, including free life insurance and BUPA, special mortgage arrangements to help with relocation and a superb pension scheme.

Contact: Andy Wright

Senior Programmer**Berkshire**

up to £7,000
Our client, a well established and profitable group within a large organisation, is developing a financial planning system and has an opportunity for a Senior Programmer to join the project.

Applicants should have at least four years experience in financial applications, preferably using COBOL and PLAN, and be capable of taking responsibility for one part of a project.

Salaries are negotiable according to experience. Large company benefits including bonus and relocation assistance.

Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W1. Tel: 01-491 4478

Systems Analysts**Covent Garden**

to £8,000 + Bonus
Our client is a major oil-drilling services company, with over 4,000 field technicians operating in 55 countries world-wide and an annual turnover which is increasing by 25%+ per year. Analysts with a sound business systems background are required to join a small team, with an IBM 370/125 under DOS/VSE due for upgrading in the near future - and a T.P. link to Paris, which is about to embark on developing a completely new range of Financial Systems. Each analyst has complete project responsibility from feasibility through to implementation.

All usual big company benefits apply - a superb bonus scheme, plus non-contributory pension scheme.

Contact: Andy Wright

(Junior) Systems Programmer**Surrey**

up to £7,000
This organisation now have their IBM 3032 installed and running under VSI with plans to introduce AIMS within one year. This presents an ideal opportunity for a systems programmer, with around two years good IBM experience, to move onto the latest range of equipment and obtain valuable further training. Applicants should be familiar with performance orientated products and have a good understanding of SYSGEN mini operating systems. The successful candidate will enjoy an environment of self-defined job responsibility and every encouragement to progress in their career.

Contact: Mike Cremer

Software Development Programmers**Sussex**

to £7,500
A progressive and fast growing manufacturing company is seeking to appoint additional software designers to augment a small development team. The requirement is for hardworking individuals who can make an immediate and significant contribution in this technical environment. Our client is interested in people who can demonstrate experience in the design of compilers, operating systems, data entry applications or communications systems. Virtually all development will be in high level language; therefore experience in ALGOL, BCPL, CORAL or PASCAL is relevant. A sound knowledge of Assembler would be a distinct advantage.

This is a first class opportunity to progress with a highly successful organisation.

Contact: Margaret Stevens

SALES EXECUTIVES P.E. £15,000 up + Car**Join in the success of this leading Mini Computer Manufacturer**

The Company is a leading manufacturer of computing equipment it has a specialised division for the marketing of its range of minicomputers and terminals, and this represents the fastest growing sector of its business. As a result, 1979 will see the doubling of the overall size of the marketing force.

The products are established and have enjoyed a very high level of market acceptance, being competitively priced and technologically advanced. The supporting Software matches the standards of the Hardware. Other elements of customer support — e.g. field engineering and demonstration/testing facilities — represent further strong points.

Sales are made either directly to end-users or through distributors and systems houses. Direct end-users generally place multiple orders for the development of their teleprocessing networks. Systems houses tend to purchase singly for discrete customer applications. Hutchinson Scoggins has been assigned to recruit four Sales Executives with the calibre to handle the enormous demand. These are situations offering an exciting challenge in the short-term, coupled with outstandingly good future prospects.

Compensation will be by way of high basic salary and a highly geared commission scheme. The range of benefits includes a car for which all expenses will be paid by the Company.

Contact: **TONY BAKER** on (01) 499 4501 (01-445 3512 out of business hours) as soon as possible.

**SALES EXECUTIVES—
DISTRIBUTOR SALES**

1. EAST ANGLIA
2. EAST MIDLANDS
3. CENTRAL/SOUTHERN SCOTLAND

Three successful sales executives are required to generate high-volume sales by developing existing systems builders and identifying and encouraging new ones. The jobs therefore require executives with an entrepreneurial spirit and a high ambition to succeed. All territories have big potential and the company will invest heavily in training — success, therefore, should not be long in coming.

RW 8/2

**SALES EXECUTIVE—
END-USER SALES**

The individual appointed to this position will have several years' successful experience of high-level D.P. selling, probably involving medium to large mainframes. Located near London, his task will be to make a major selling impact on large companies already heavily committed to computing. This will involve dealing with top technical and general management, and contributing to the corporate development plan.

RW 8/1

CALLING ALL SUCCESSFUL**CONTRACTS
SALES PEOPLE****DOES YOUR FUTURE MATCH
THIS?****Opportunity to**

1. Become the Managing Director
2. Enjoy equity participation
3. Build an organisation
4. Run the company your own way
5. Make a LOT of money.

To qualify you need an excellent track record selling contract services and to be a self starter totally motivated by success.

WARNING

This is no sinecure. Do not apply unless you have boundless industry and determination to succeed.

Call: **DAVID J. HUTCHINSON** on 01-499 4501 for a very confidential discussion.

RW 84

SOFTWARE PEOPLE

Real-time systems employing
**PDP/11S and
Micro-processors**

**£ Negotiable
plus Relocation costs**

This is a small, intimate company, heavily funded by its parent organisation, a leading British industrial group. It thus provides an ideal working environment, coupled with financial stability and security.

The people that are wanted will have experience with high-level or Assembler languages, preferably on **PDP11s** with **RSX11-M**, but other relevant experience may be useful. They will join this small team employed on the development of a wide variety of real-time control systems.

The jobs are based in Berkshire. You will be surrounded by stimulating colleagues and have access to abundant in-house computing facilities. With increasing use being made of micro-processors (especially **LSI-11**, **Intel 8085** and **RCA 1802**). There is every chance to enlarge your professional experience.

Applications please, by phone or letter, to **TONY BAKER** at the address at the bottom of this page, (01-499 4501).

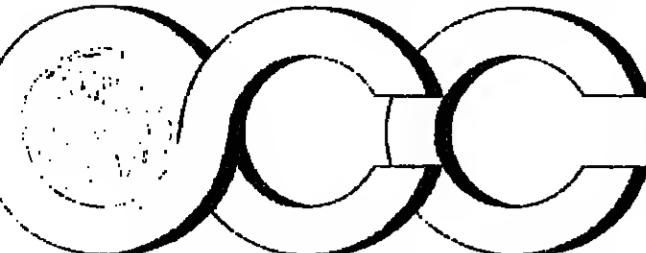
REF RW 8/3

hutchinson-scoggins recruitment

47/48 New Bond Street (entrance in Maddox Street)

London W1Y 0HE Telephone 01-499 4501





Specialists since 1971 in
UK and international
computer appointments.
We have many other jobs
on our files and offer
a free consulting
service to computer
professionals.

OPERATORS

Junior and Senior Operators with a minimum of 6 months' experience on any mainframe required urgently. Listed below is a small selection of current vacancies.

IBM	OS	Chief Op	3 yrs	£6000
IBM	OS	S/Ldr	4 yrs	£6000
IBM	OS	Snr Op	3 yrs	£5800
IBM	OS	Operator	2 yrs	£4600
IBM	OS	Operator	1 yr	£4300
IBM	OS	S/Ldr	2 yrs	£5000
IBM	OS	Snr Op	2 yrs	£5000
IBM	OS	Operator	1 yr	£4600
IBM	OS	Operator	1 yr	£4200
ICL	CII	Snr Op	2 yrs	£4500
ICL	CII	Snr/Op	2 yrs	£4500
ICL	ANY	Operator	1 yr	£4200
ICL	CII	Operator	1 yr	£4000
ICL	2900	Operator	1 yr	£4300
DEC	POP	Operator	2 yrs	£4600
UNIVAC	1108	Operator	2 yrs	£4200
UNIVAC	9400	Operator	1 yr	£3800
H'WELL	GCOS	Operator	1 yr	£3600

Laptop.com

Consultants and Project Managers	£6,500-£9,500
Analysts	£5,500-£9,500
Programmers	£4,000-£7,500

A major UK Software House is rapidly expanding its operation in the London area. The positions are based in London but there are also many other vacancies in Reading and Wimblsow.

The applications are generally commercial with a strong emphasis on financial systems. Opportunities exist to work on the development of Real Time Systems.

Senior candidates should have extensive experience in commercial systems development or may be specialists in an application or technical area.

Programmers and Analysts will work on a variety of computer systems ranging from medium size i.e. ICL 2903 to larger IBM or ICL systems.

To apply for any of the above positions, contact Renée Nutt or Fren Setter on 01-242 9356 (day) or 01-874 6372 (evenings). Ref: 503/CW.

Informal interviews — Our clients will be at our premises on Tuesday, 27th February, 5.30-7.30

OCC Computer Personnel Limited,
16 Bedford Row,
London WC1R 4EB,
Telephone: 01-242 9356



Member
Computing
Services
Association

Systems Programmers — all levels

In order to develop our next generation of micro-computer based terminals we need innovative Programmers who are looking for an opportunity of applying their abilities to the design and development of complete systems.

Those abilities should include the capability of taking a product from initial concept through design and development into production.

Specifically, you will be involved on all of the following:

- * Operating Systems
- * Interpreters
- * User Interfaces
- * Maintenance and Diagnostic Routines

Previous experience in any of the above would be useful but not essential, enthusiasm being the most important factor.

We are looking for Systems Programmers at all levels, from recent graduates to those with many years of experience who are looking for a new challenge.

Initially you will be based at Croydon although some travel will be necessary in order to fulfill your job responsibilities. Long term career opportunities exist both in the UK and overseas.

The compensation package will reflect the importance placed on these positions. Salary, in particular, will not inhibit selection of right persons.

Please write or call, Cliff Marks
Personnel Manager
Burroughs Machines Ltd.
512 Purley Way
Croydon, Surrey CR0 4NZ
Telephone 01-686 0356



Burroughs

EXPERIENCED SOFTWARE ENGINEER

Required by International company offering £7K. Usual large company benefits including pension scheme, four weeks holiday, career development plus opportunities for European travel. Applicants should have four years' experience with IBM OS hardware, the ability to modify an OS/VSE operating system, knowledge of assembly language and of IBM OS utilities, facilities and JCL. French and/or German would be an advantage.

For early interview telephone 01-405 0684 quoting ref. JE/348, DRAKE SENIOR APPOINTMENTS (Consultants), 121 Kingsway, London, WC2.

UNIVERSITY OF LEECS

SYSTEMS ANALYST/PROGRAMMER

Applications are invited for the post of SYSTEMS ANALYST/PROGRAMMER in the COMPUTER RESEARCH GROUP from April, 1979. Candidates should have a sound knowledge of COBOL programming and systems analysis to degree level and/or other relevant qualifications would be an advantage.

The successful candidate will play a major part in the detailed design, programming and implementation of financial and non-financial projects within the Administrative Computer Unit. This provides a wide range of processing services to those members of the administrative staff responsible for financial and library record keeping. The present in-house machine is an ICL 1901 T but there are plans to enhance this facility and to develop on-line applications.

Salary on the 1A scale for Administrative Staff: £3384-£5658 (under review).

Application forms and further details of the post may be obtained from the Secretary, Computer Research Group, D.J.T., quoting reference number 119, 15/2, closing date for application 12 March, 1979.

CONTRACT PROGRAMMERS REQUIRED

Send C.V. and Data available to Wedge Wood Software Services, Oldham Road, Southgate, Northants NN1 4UY

Head of Computing c. £13,000 - Reading

Thames Water, which manages all water services for over 12 million people, is the largest operation of its kind in the world. It makes extensive use of computers and at its Reading establishment is currently replacing existing ICL 1900 systems with a distributed processing network. This will comprise a large mainframe computer with linked processors at a number of locations to provide both conversational and bulk transmission services.

An Assistant Director (Computing) is now to be appointed to be responsible for leading a team of 50 engaged in the implementation of the new computer, conversion of existing systems and the development of new applications, particularly in the area of financial control, although other applications, including scientific, are planned. Responsibilities will also cover the financial and operating performance of the department, participating in internal policy groups and representing the Authority at national level on computing matters.

This appointment calls for a man or woman, preferably aged 35+, with a good degree and several years' experience of managing a large data processing facility including systems conversion and the implementation of systems using remote computer networks. Applicants should also have the sensitivity, commercial and technical awareness, and communications ability necessary to negotiate computer policy with a variety of user groups. Some experience in user of computer services would also be useful.

Salary will be negotiable around £13,000 per annum plus an excellent supplementary benefits package. If the challenge of managing such an involvement in data processing interests you, write or telephone for an application form to Assistant Director (Personnel Staff), Thames Water Authority, New Town Hall, Flushing Avenue, London EC1R 4TP. Telephone: 01-837 3300 Ext. 024. Closing date for receipt of applications: 15th March, 1979.

Thames Water

Employment opportunities for programmer/analysts in California

USA

Successful applicants will possess as a minimum requirement, working experience in IBM OS COBOL, together with sufficient ICL and dump-handling skills. Of these applicants, preference will be given to those who have experience in on-line IMS (DL/I) programming. Consideration will also be given to OS COBOL experience coupled with any of the following: IMS (DL/I) batch programming, CICS, PL/I and Assembler.

Salaries from £7k to £13k depending upon level of experience, plus relocation, reimbursement possibilities.

Informal interviews will be conducted in London in a few weeks. Applications may be made by writing as follows: AB Executive (Bristol) Ltd., Consultants, Phone: Bristol (0222) 436611

AB Executive (Bristol) Ltd.
— Consultants
Phone: Bristol (0222) 436611

Send C.V. and Data available to Wedge Wood Software Services, Oldham Road, Southgate, Northants NN1 4UY

Oldham Road, Southgate, Northants NN1 4UY

Telephone 01-837 3300 Ext. 024

Base Salary £7,500-£10,000+ on Quota + Prestige Car + Major Fringe Benefits London and Home Counties

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You know the salesman behind the computer is as important as the product itself!

Income package £13k+ company car

Our Clients are an international mini manufacturer who are, without doubt, market leaders within Europe and the UK and as a Sales Executive you will be using your sales flair to tackle some of the most challenging problems in industry today with the confidence of knowing that working with you is a professional group of pre and post sales technicians plus one of the finest field service teams in the U.K.

You should be self-motivated and self-confident with a successful track record in selling, and be between 25-35 years of age, and bring to our Clients a great deal of enthusiasm and commitment.

In return you will be given a substantial income package with guarantee plus company car and an important position offering you tremendous scope for personal achievement and development.

These positions are located in London, North West/North East England, (based at their Manchester offices) as well as Bristol.

For further details and immediate confidential interview contact:-
Richard Champion: office 021 236 3781 or evenings/weekends: Hagley 4166



SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST
Equity and Law House, 35-37 Great Charles St., Queensway, Birmingham B3 2BR



Computer Programmer

Salary £4641 - £5991 pa.

The Electricity Council is the central co-ordinating body of the electricity supply industry in England and Wales.

You will join a group which provides computing services to the Economics and Forecasting Branch and various other Branches within the Electricity Council.

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You should have at least two years' programming experience. Please write giving details of age, qualifications and experience including languages, hardware and application areas with which you have been associated quoting CW/24 to:-

Duncan Ross,
Recruitment & Development Officer,
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30 Millbank, London SW1P 4RQ.

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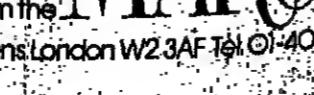
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Further particulars and application form available from the Registrar, University of Salford, Salford M5 4WT, to whom completed applications should be returned by 8 March, 1978, quoting appropriate reference.

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Salary in accordance with New Town Grade IV — £3,852 to £4,286 inclusive of Supplement and Fringe London Weighting Allowance.

Application forms are obtainable from the Personnel Officer, Basildon Development Corporation, Gifford House, Basildon, Essex, SS13 2EX or by telephoning Basildon 853281 ext. 121 and should be returned not later than first post on 7th March, 1979.

For further information contact Tony Budd on the above number ext. 22.

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Applications are invited for the above post which is offered for one year in connection with an SSRC sponsored investigation into the optimisation of large programs on ICL 2900 series computers.

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Further particulars are available from the Secretary to the University, University of Edinburgh, Old Edinburgh, Edinburgh, EH8 9YL. In which applications should be sent by letter before the 8th March, 1979. Please quote reference 6007.

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All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If copy is artwork it should be supplied 12 noon on a Tuesday.

Ring David Abbey for further details on 01-281 8016.

For full details and application form please apply, quoting ref. 8001, stating post concerned and giving details of age, qualifications and experience to—



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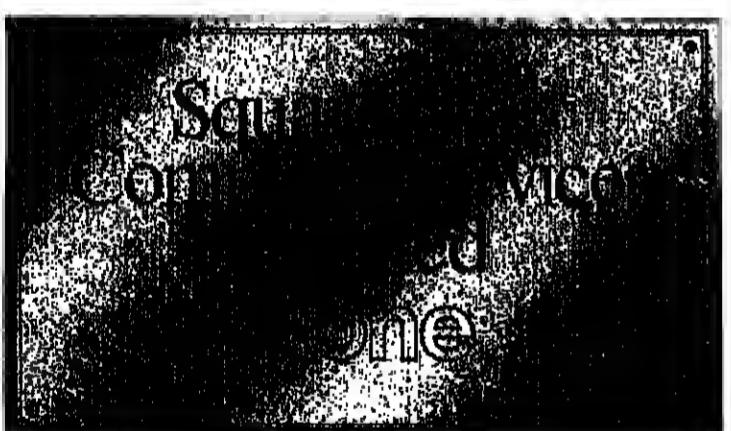
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HALIFAX PROJECT LEADER	£6,000 + Benefits	LEEDS SYSTEMS PROGRAMMER	£5,500	LEEDS SYSTEMS PROGRAMMER	£5,500	LEEDS SYSTEMS PROGRAMMER	£5,500
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HALIFAX PROJECT LEADER	£6,000 + Benefits	LEEDS SYSTEMS PROGRAMMER	£5,500	LEEDS SYSTEMS PROGRAMMER	£5,500	LEEDS SYSTEMS PROGRAMMER	£5,500
A senior systems analyst required for a large account.		Commercial systems programmer required.		Commercial systems programmer required.		Commercial systems programmer required.	



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THE SALES AND MARKETING BIT

FORECASTING—IV

The double barrelled approach....

For instance, might be by user/industry type and/or nature of service. The former could be as simple as commercial or technical, or there might be any number of sub-divisions.

The latter could be by batch, interactive, "over-the-counter," package, bespoke programs, or whatever is appropriate to a given company situation. Other alternatives might be by sales districts or territories, key customers and so on — the main objective being to isolate possible "rogue" trends.

It is not conceivable that an apparently satisfactory total growth rate might hide a severe decline within product or territorial subdivision.

Having established these logical demarcations it is then necessary to identify particular trends. Almost certainly the monthly (or whatever period) and troughs of revenue will be such that they tend to obscure the curves of growth or decline they actually contain.

This most basic and most commonly used methodology is that of simple extrapolation. The basic assumption of this approach is that the past has pre-determined the present, which in turn will dictate the future. The arithmetic progression of this approach is that expansion will continue at a consistent and pre-determined rate, i.e. a straight line on the sales graph. This method considers neither sudden expansion nor rapid contraction. It is the "wedge" forecast I referred to in the first part of this discussion on forecasting and the one that makes least sense.

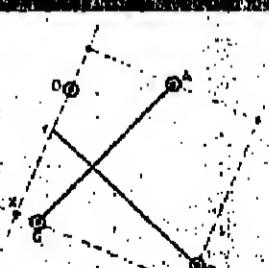
However, exponents of this approach often attempt to overcome its inadequacies by a regulating device known as weighting. This approach attempts to smooth possible major problems which could have the effect of reducing sales, and the significant opportunities which might in contrast increase sales potential.

Trend analysis is also conceptually simple, but its application can be complex. The basis of information is historical performance over a period which is relevant to a particular industry or market-place. In the computer industry, demand and technology push things along so fast that some elements which are key factors today may not even have existed five years ago. In my experience 2/3 years is as far back as one can sensibly go.

Having decided on the historical timescale, a breakdown of total sales into key areas of sales activity is essential in order to identify the relative growth rates of all sectors. It is unlikely that growth (or even contraction) will be consistent.

The kind of division one might contemplate in a service bureau environment shows the board to be 8 x 8 in size:

Puzzle Answer



DRAW in AC, and construct BY perpendicular and equal to it. YD extended in both directions must then pass through the centres of all squares on the left side of the board, and the other three 'partner' lines can quickly be added. The dimension 'AC' marked around the perimeter shows the board to be 8 x 8 in size.

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SUPPLIER OF OEM printers and print mechanisms, Dataplus Ltd has moved its Cheltenham headquarters to larger premises at 49 Roman Road, Cheltenham, Gloucestershire GL1 1JG. The telephone number remains the same, 0242 800000. The handle operating business Lington Information Systems has moved into new offices at 188 Oxford Street, London W1R 1TD. Tel: 01-438 0366.

Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 27 (Block CAPITALS)

While Hex has fallen into the hands of the Error Squad, and Circ is down a mine shaft, Ascii has not been idle.

HEX left Ascii in the hills with the lethal gigantic Induction program blasted into his PROM and instructions to proceed as fast as possible to Fort Ranfour.

Asci ambled along for a while sniffing the crisp mountain air, anjoying his jsunt. Now and then he paused to pay his respects to a particularly imposing fir tree. The sun was shinin, and he was havin a good tims.

Suddenly everything changed. In characteristic slipshod fashion, Hex had left a zero off the end of the delay loop initialisation counter. In consequence, Ascii's warhead had been primed with a short fuse, and had gone off prematurely.

He tore off as if stung by a hornet. He just kept running. He ran up the critical path, down the audit trail, along the disc track and didn't stop running till he came to Route 6, the congested data highway that led into Fort Ranfour.

From the verge, he looked down on the traffic busily streaming in both directions, guided to its destination along invisible buried rails, each message tightly encapsulated in its own logical packet, oblivious of the outside world. Then in the distance he heard the distinctive melancholy howl of a police train. He backed off slightly and watched as it rattled past, laden with its cargo of bits. There was a start bit on the engine, eight wagons piled high with data bits, and a stop bit on the guard's van bringing up the rear. It was a 1200 kilobaud express, dead at time. He listened to its rhythmic clatter recede into the distance.

On impulse, he decided to join in; and cantered along the embankment looking for the nearest slippery. Presently he came to a large toll gate. This was the logic gate through which he had to pass to get on to the data highway. It was an impressive edifice, faced with marble. It consisted of three archways. The major one, in the centre, was barred by a heavy wrought-iron gate; but the two side entrances were open. Over the main arch the words "Abandon hope, all ye who enter here!" were engraved in bold Roman capitals. And from the top three gargoyles stared balefully down: they were busts of the three great logicians, Aristotle in the middle, flanked by George Boole and Bertrand Russell.

While he stood and stared in awe, the two guardians of the gateway sprang out into his path. They were grotesque.

On two squat, round, seemingly human bodies perched dog's heads, one looking like a green mournful St Bernard, the other a Pekinese with squashed-up features. Their clothing was luminous. The one on the left wore bright green trousers with a blue jacket. The other one wore blue trousers and a striped green top.

"I'm Peek," announced the Pekinese with the green trousers.

"I'm Poke," said the St Bernard on the right.

"You'll have to choose, you know," asserted Peek.

"This is a very exclusive OR gate," added Peek, "no fuzzy logic here."

"Once you're in, you're in," affirmed Peek. "If you get it wrong first time there's no second chance."

"Vice versa and conversely," echoed Peek: "once you're out, you're out."

"And you had better be quick about it," concluded Peek.

Asci looked puzzled.

"I know what you're thinking," said Peek; "but it isn't so, now."

"Contrariwise," continued Peek, "if it was so, it might be; and if it were so it would be; but as it isn't, it isn't. That's logic."

Asci wondered what would happen if he made the wrong choice.



"If you try to enter through the exit, the penalty is underflow," stated Peek ominously.
"Otherwise," exclaimed Poke, "it's overflow if you leave through the entrance."
"Bywise," growled Peek, "it's logical negation for you if you exceed the time limit."

"Affirmative," barked Peke in counterpoint.
"Ditto," shouted Peek.
"Ditto, ditto," cried Poke.
Asci hesitated.

"Come on then," urged Peek, "which is it to be?"

"Left or right?" asked Poke.

"Head or tail?" inquired Peek.

"It's now or never," declared Poke.

"Or else!" threatened Peek.

There was really no reason for preferring one way or the other.

"I'll give you a clue," offered Peek magnanimously. "It's cheating, but I'm in a good mood today. If you can solve this riddle, we'll tell you the right way."

"Riddles cost extra," added Poke gravely. "Difficult ones cost double. You can pay at the turnstile on your way through."

"Here you are then," said Peek; "what goes backwards and forwards, sounds like a bicycle, but never stops?"

Asci was dumbfounded. It seemed a very hard one to him.

"I suppose you think that's too complex," said Peek, after he'd been silent awhile.

Asci nodded.

"Well it isn't, you know. I'll explain: we define a thing as 'green' if it is green on alternate Thursdays and turns blue at other times. We call it 'bleen' if it is blue on alternate Thursdays and green at all other times. It appears that these are very complex definitions. But it is really green which has a complex meaning. What we call 'green' is actually something that is green on alternate Thursdays and bleen the rest of the time."

"Likewise," agreed Poke. "Look at my shirt for instance. Now do you understand?"

Asci was as baffled as ever.

"I'd better give you another hint, then," said Peek.

"You're not trying hard enough."

"Wait a moment," interjected Poke, clutching hold of his companion's sleeve. He had just noticed something. "He's got the spots!"

Poke observed him intently. Asci resembled nothing so much as 101 dalmatians. "Help!" he cried, "he's gone gigoic!"

Turning green and bleen by turns with fear, the pair of them collided with each other, picked themselves up, and scattered in all directions.

"Which door should he take? What goes backwards and forwards, sounds like a bicycle, and never stops?"

FR. Richard Forsyth, Kof.

BOOK REVIEWS

Practical approach taught by example

A Practical Introduction to Pascal, by J. R. Wilson and A. M. Addyman. 144pp. £3.50. MacMillan Press.

THIS text on Pascal is described as being suitable for "beginners and experienced programmers" and happily achieves both aims by a practical approach which teaches by example.

The book begins with a refreshingly introduction re-emphasising the use of diagrams as explanatory tools. These are chiefly the "bubble diagrams" used to describe the syntax itself, but later on blocks and stacks demonstrate the intricacies of scope and recursion. Chapter 2 gives the form of a program and basic calculations. It explains to the beginner that $A=1$ is not a mathematical identity and that programs are executed "left to right and up to bottom," but does not labour the points. Chapter 3 completes the introduction by covering all five Pascal

control structures. Equal weight is given to conditionals and counting loops and a low key attitude is adopted to the goto.

Chapters 13 and 14 cover advanced uses of procedures and the dynamic data facility. The text ends with a worked example of a fairly large program putting into practice the techniques of stepwise refinement and readable programming which were emphasised all along. The appendices include the full syntax of Pascal, answers to selected

problems and (very useful) the address of the Pascal Users' Group.

Wilson and Addyman manage to put across the true spirit of Pascal in a slim, attractive and error-free monograph. I can recommend it for first courses in programming, as well as for individuals who wish to become acquainted with this language which is rapidly spreading. In academic, business and, even, defence circles.

JUDY M. BISHOP
Wiltshire and University

grams present in other chapters and leaving the reader unimpressed by the real power of sub-ranges and symbolic values.

Chapters 13 and 14 cover

problems and (very useful) the address of the Pascal Users' Group.

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JUDY M. BISHOP
Wiltshire and University

Denotational semantics, by Joseph Stoy. £14. Massachusetts Institute of Technology Press, 128 Buckingham Palace Road, London, SW1. Tel: 01-730 0208.

EVOLVED from a series of lecture notes for a graduate course given at MIT in 1973, this book is a lengthy and detailed introduction to the Scott-Strachey theory of mathematical semantics. Anyone who has read the expository paper by Tennent¹ and wants to know more is urged to read this book.

The fourteen chapters of the book

take the reader through the relevant background mathematics (λ-calculus, lattices)

and formal semantic descriptions of a progression of simple languages.

These languages increase in complexity and power causing earlier

semantics to be revisited to cope with the new situations. This constructive approach allows the reader to tackle

Limited readership

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reference.

Part III discusses the use

of programs, not necessarily

Fortran, in various applica-

tions: two chapters

discuss numerical cal-

culations and error analysis and

assume some knowledge of

calculus and matrices.

Other chapters deal with

the computations likely to

be needed for elementary

statistics, discrete simula-

tions, data processing

(i.e. file maintenance, sort-

ing, etc.) and the use of

numerical tables, etc.

There is a mixed non-

numerical chapter on graph

theory, games and search

Welcome addition to literature

An Introduction to pro-
gramming and applications with Fortran by T. E. Hill and D. D. F. Day. Addison-Wesley, Don Mills, Ontario, Canada.

THIS is not, as its name might suggest, an addition to the already excessive number of Fortran textbooks. Rather it is an introduction to programming and to problem solving as subjects in their own right and the realisation of programs in Fortran.

The weakest part of the book is Chapter 7 which deals with enumeration of Pascal's scalar types, undefined by any of the example pro-

grams. The exercises and dis-
cussion of the answers form an integral part of the text.

Part II contains a straightforward exposition of Fortran, showing how to render algorithmic constructs in the language, mentioning the calling of Fortran 77 and making the user aware of possible dialect problems. If anything, the authors are very cautious in their descriptions.

The book is divided into three distinct parts.

Companies on the move

and a final one on inter-

preters and translators.

There are appendices on